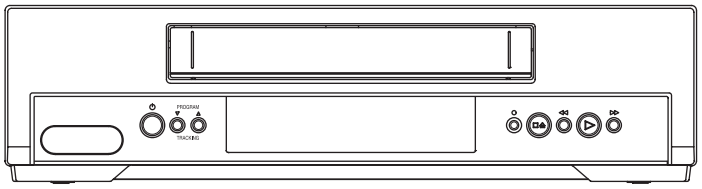
HITACHI

SERVICE MANUAL



SM0410

VT-FX440E(UK)
VT-FX540E(UK)
VT-MX410E(UK)

VHS PAL

VIDEO Plus+®

DO NOT RESELL OR DIVERT IMPROPERLY.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE DECK

April 2004 Digital Media Division

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1 CAUTION FOR SAFETY IN PERFORMING REPAIR

1-1 IMPORTANT SAFETY PRECAUTIONS

1-1-1 Product Safety Notice

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by a ⚠ on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are carefully inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

1-1-2 Precautions during Servicing

A. Parts identified by the ⚠ symbol are critical for safety. Replace only with part number specified.

B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.
Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

C. Use specified internal wiring. Note especially:

1)Wires covered with PVC tubing

2)Double insulated wires

3)High voltage leads

D. Use specified insulating materials for hazardous live parts. Note especially:

1)Insulation tape

2)PVC tubing

3)Spacers

4)Insulators for transistors

E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).

G. Check that replaced wires do not contact sharp edges or pointed parts.

H. When a power cord has been replaced, check that 5 - 6 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Be careful that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

K. Crimp type wire connector
The power transformer uses crimp type connectors which connect the power cord and the primary side of the transformer. When replacing the transformer, follow these steps carefully and precisely to prevent shock hazards.
Replacement procedure

1)Remove the old connector by cutting the wires at a point close to the connector.
Important: Do not re-use a connector. (Discard it.)

2)Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

3)Align the lengths of the wires to be connected. Insert the wires fully into the connector.

4)Use a crimping tool to crimp the metal sleeve at its center. Be sure to crimp fully to the complete closure of the tool.

L. When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC outlet.

1-1-3 Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts, and wires have been returned to their original positions. Afterwards, do the following tests and confirm the specified values to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1-1-1)

Table 1-1-1 : Ratings for selected area

AC Line Voltage	Clearance Distance (d), (d')
220 to 240 V	≥ 3 mm(d) ≥ 6 mm(d')

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

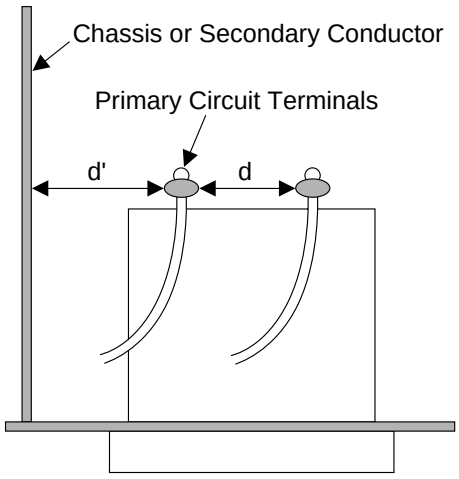


Fig. 1-1-1

2. Leakage Current Test

Confirm the specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

Measuring Method (Power ON) :

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across the terminals of load Z. See Fig. 1-1-2 and the following table.

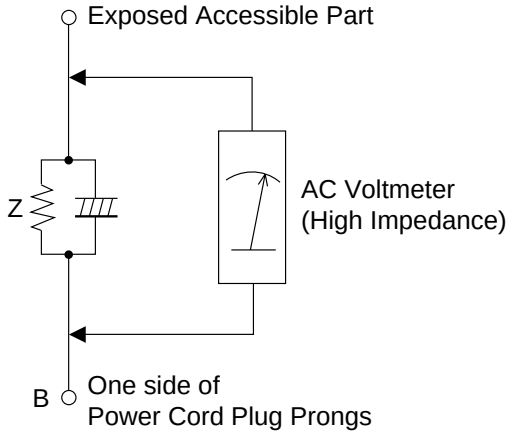


Fig. 1-1-2

Table 1-1-2: Leakage current ratings for selected areas

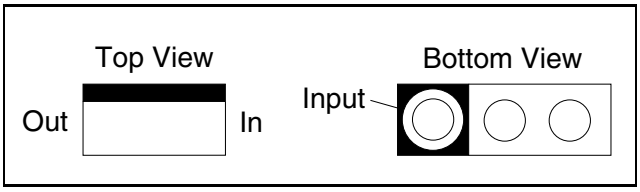
AC Line Voltage	Load Z	Leakage Current (i)	One side of power cord plug prongs (B) to:
220 to 240 V	2kΩ RES. Connected in parallel	i≤0.7mA AC Peak i≤2mA DC	RF or Antenna terminals
	50kΩ RES. Connected in parallel	i≤0.7mA AC Peak i≤2mA DC	A/V Input, Output

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

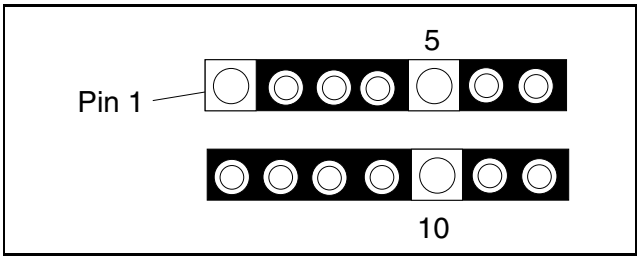
1-2 STANDARD NOTES FOR SERVICING

1-2-1 Circuit Board Indications

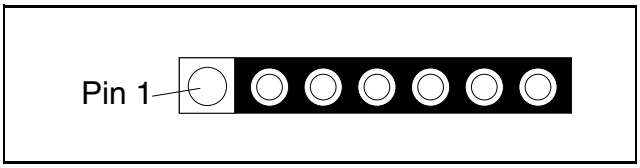
1. The output pin of the 3 pin Regulator ICs is indicated as shown.



2. For other ICs, pin 1 and every fifth pin are indicated as shown.

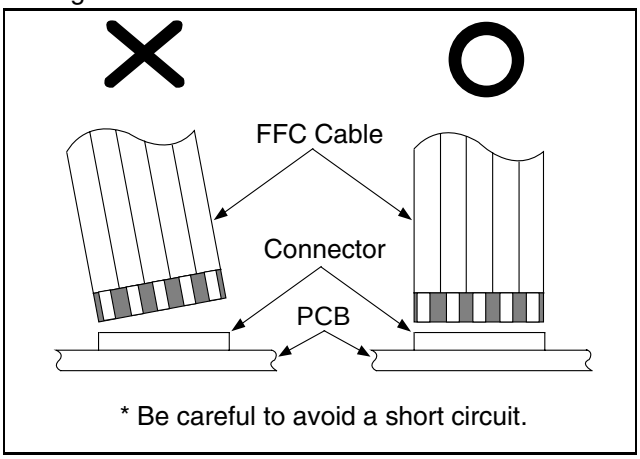


3. The 1st pin of every male connector is indicated as shown.



1-2-2 Instructions for Connectors

1. When you connect or disconnect the FFC (Flexible Foil Connector) cable, be sure to first disconnect the AC cord.
2. FFC (Flexible Foil Connector) cable should be inserted parallel into the connector, not at an angle.



1-2-3 Pb (Lead) Free Solder

When soldering, be sure to use the Pb free solder.

1-2-4 Instructions for Handling Semi-conductors

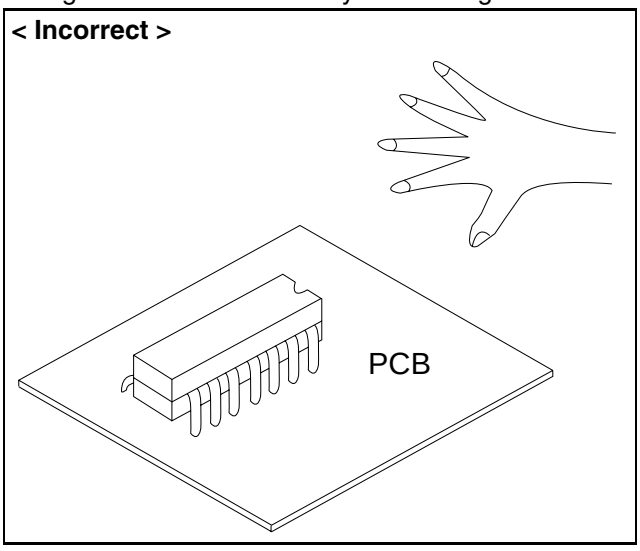
Electrostatic breakdown of the semi-conductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

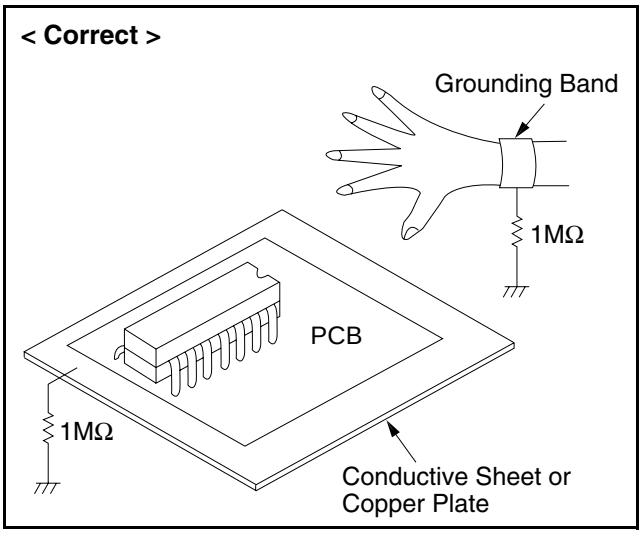
1. Ground for Human Body

Be sure to wear a grounding band (1MΩ) that is properly grounded to remove any static electricity that may be charged on the body.

2. Ground for Workbench

(1) Be sure to place a conductive sheet or copper plate with proper grounding (1MΩ) on the workbench or other surface, where the semi-conductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semi-conductors with your clothing.





2 GENERAL INFORMATION

2-1 SPECIFICATIONS

[VT-FX440E(UK)]

General Specifications

Television system:	PAL I TV standard
Video heads	Six comprising of Four-video and Two-audio heads Helical scan system
Tape width :	12.65mm
Tape speed	
SP :	23.39mm/sec.
LP :	11.70mm/sec.
Tuner channel	
	IRA~IRJ E21~E69 CATV
RF converter :	Built-in UHF converter
Converter output :	UHF Channel 22 to 69 (adjustable)
Timer indication :	24-hour system
Operating temperature :	5ºC ~ 40ºC
Terminals	
AERIAL :	Coaxial type, male
RF OUT :	Coaxial type, female
AUDIO/VIDEO :	21 pin scart socket x 2
AUDIO output :	RCA connector x 2

Electrical Specifications

Video output level :	1Vp-p
Video output impedance :	75Ω unbalanced
Audio output level :	-6dBv
Video input level :	0.5 ~2.0Vp-p
Audio input level :	-10dBv
Video S/N ratio (STANDARD):	45dB
Audio S/N ratio (STANDARD):	41dB

Other Specifications

Power requirement :	220-240V ~ 50Hz
Power consumption :	25 Watts (Stand by: 3.5watts)
Dimensions :	W 360mm H 92mm D 226mm
Weight :	2.6 Kg. (approx.)

• Designs and specifications are subject to change without notice.

[VT-MX410E(UK)]

General Specifications

Television system:	PAL I TV standard
Video heads	Rotary two-head helical scan system
Tape width :	12.65mm
Tape speed	
SP :	23.39mm/sec.
LP :	11.70mm/sec.
Tuner channel	
	IRA~IRJ E21~E69 CATV
RF converter :	Built-in UHF converter
Converter output :	UHF Channel 22 to 69 (adjustable)
Timer indication :	24-hour system
Operating temperature :	5ºC ~ 40ºC
Terminals	
AERIAL :	Coaxial type, male
RF OUT :	Coaxial type, female
AUDIO/VIDEO :	21 pin scart socket x 2

Electrical Specifications

Video output level :	1Vp-p
Video output impedance :	75Ω unbalanced
Audio output level :	-6dBv
Video input level :	0.5 ~2.0Vp-p
Audio input level :	-10dBv
Video S/N ratio (STANDARD):	45dB
Audio S/N ratio (STANDARD):	41dB

Other Specifications

Power requirement :	220-240V ~ 50Hz
Power consumption :	25 Watts (Stand by: 3.5 watts)
Dimensions :	W 360mm H 92mm D 226mm
Weight :	2.6 Kg. (approx.)

• Designs and specifications are subject to change without notice.

Overview

VT-FX540E(UK) is the model that deleted “VIDEO Plus+” function from VT-FX440E(UK).
With this, the [VIDEO Plus+] button on remote controller is also deleted.

[VT-FX540E(UK)]

Specifications

Video section	TV system	PAL I	
	Video head	Rotating 4 heads	
	Recording system	Rotating 2 head helical scan brightness signal FM method VHS standard for methods to directly record color signal low frequency conversions	
	Audio track	Hi-Fi audio track: 2 channel Normal audio track: 1 channel	
	Tape	VHS-type videocassette	
	Tape speed	{SP}: 23.39 mm/s {LP}: 11.70 mm/s	
	Maximum record and playback time	{SP}: 4 hours (with E-240 used) {LP}: 8 hours (with E-240 used)	
	Receiving channel	CH Indication	TV Channel
		01-10	TRA-IRJ, GAP
		21-69	E21-E69
		74-78	X.Y.Z.Z+1.Z+2
		88-99, 100	S1-S20, GAP
		121-141	S21-S41
	Reception system	Up-heterodyne	
	RF converter	RF CONVERTER	
	Converter output	UHF 22 - 69 ch, I: 35 ch	
	Timer display	24-hour system	
	Video output impedance	75 Ω	
	Video output level	1.0 V P-P	
	Audio output level	-6 dB 1 kΩ unbalance (high impedance)	
	Video input level	0.5-2.0 V P-P	
	Audio input level	-10 dBV	
	Video S/N ratio	45 dB or more	
	Audio S/N ratio	41 dB or more	
	Hi-Fi audio	Frequency characteristic: 20-20,000 Hz Dynamic range: 70 dB or more	
Terminal	Antenna input	DIN (input) terminal	
	Antenna output	DIN (output) terminal	
	Video input	SCART JACK (AV 1, 2)	
	Video output	SCART JACK (AV 1, 2)	
	Audio input	SCART JACK (AV 1, 2)	
	Audio output	SCART JACK (AV 1, 2), PIN JACK (REAR)	
Others	Power supply	AC 220-240 V +/-10%, 50 Hz +/-0.5%	
	Power consumption	25 W (Standby: 3.5 W)	
	Temperature range for operation	5 °C - 40 °C	
	Dimensions	360(W) mm x 92(H) mm x 226(D) mm	
	Weight	2.6 kg	

2-2 Comparison of Models

2-2-1 Comparison of Features

O: YES ---: No

ITEM		VT-FX440E(UK) VT-MX410E(UK)	VT-FX340E(UK) VT-MX310E(UK)	VT-FX540E(UK)
APPEARANCE	Cabinet Size	360(W) x 92(H) x 226(D) mm	360(W) x 92(H) x 226(D) mm	360(W) x 92(H) x 226(D) mm
	Weight	2.6kg	2.6kg	2.6kg
	Power Consumption	25W	20W	25W (Standby: 3.5W)
VIDEO	Video Format	VHS	VHS	VHS
	Y/C Separation	Comb Filter	Comb Filter	Comb Filter
	YNR (Luminance Noise Reduction) Circuit	O	O	O
INPUT/ OUTPUT	A/V In/Out Terminal (Scart)	2 Scart	2 Scart	2 Scart
	Audio Out Terminal (Us Pin Rear)	O [VT-FX440E(UK)] --- [VT-MX410E(UK)]	O [VT-FX340E(UK)] --- [VT-MX310E(UK)]	O
	RF In/Out	PAL-I	PAL-I	PAL-I
OTHER	Remote Controller	VT-RM440E [VT-FX440E(UK)] VT-RM410E [VT-MX410E(UK)]	VT-RM340E [VT-FX340E(UK)] VT-RM310E [VT-MX310E(UK)]	VT-RM540E
	Stereo CM Skip Feature	---	---	---
	Auto Clock Feature	O	O	O
	Number of Timer Programming	8 Program/year	8 Program/year	8 Program/year
	Self Diagnosis Function	O (4 Modes)	O (4 Modes)	O (4 Modes)
	Back-up Time	60s	60s	60s
	SQPB	---	---	---
	Multi Search Feature	O (Index, Time Search, Quick Find)	O (Index, Time Search, Quick Find)	O (Index, Time Search, Quick Find)
	Index Marked Each Recording Index Search	O [VT-FX440E(UK)] --- [VT-MX410E(UK)]	O [VT-FX340E(UK)] --- [VT-MX310E(UK)]	O
	Time Search	O [VT-FX440E(UK)] --- [VT-MX410E(UK)]	O [VT-FX340E(UK)] --- [VT-MX310E(UK)]	O
	Quick Find	O [VT-FX440E(UK)] --- [VT-MX410E(UK)]	O [VT-FX340E(UK)] --- [VT-MX310E(UK)]	O
	Frame-Advance	O [VT-FX440E(UK)] --- [VT-MX410E(UK)]	O [VT-FX340E(UK)] --- [VT-MX310E(UK)]	O
	Slow-Motion	O [VT-FX440E(UK)] --- [VT-MX410E(UK)]	O [VT-FX340E(UK)] --- [VT-MX310E(UK)]	O
	Nicam	O [VT-FX440E(UK)] --- [VT-MX410E(UK)]	O [VT-FX340E(UK)] --- [VT-MX310E(UK)]	O
MECHANISM	Search Speed	SP: X5/X7 LP: X5/X11	SP: X5/X7 LP: X5/X11	SP: X5/X7 LP: X5/X11
	FF/REW Time (T-120 Tape)	FF: approx. 100s, REW: approx. 100s	FF: approx. 100s, REW: approx. 100s	FF: approx. 100s, REW: approx. 100s
	Head Composition [VT-FX440E(UK)] / [VT-FX340E(UK)]	DA4+Hi-Fi SP: 2[49/49µm] LP: 2[25/25µm] Hi-Fi Audio: 2[28/28µm]	DA4+Hi-Fi SP: 2[49/49µm] LP: 2[25/25µm] Hi-Fi Audio: 2[28/28µm]	DA4+Hi-Fi SP: 2[49/49µm] LP: 2[25/25µm] Hi-Fi Audio: 2[28/28µm]
	Head Composition [VT-MX410E(UK)] / [VT-MX310E(UK)]	DA2 28/28µm	DA2 28/28µm	
	Head Material [VT-FX440E(UK)] / [VT-FX340E(UK)]	SP: Ferrite LP: Ferrite Hi-Fi Audio: Ferrite	SP: Ferrite LP: Ferrite Hi-Fi Audio: Ferrite	SP: Ferrite LP: Ferrite Hi-Fi Audio: Ferrite
	Head Material [VT-MX410E(UK)] / [VT-MX310E(UK)]	SP: Ferrite LP: Ferrite	SP: Ferrite LP: Ferrite	
	VISS	O (Index Search)	O (Index Search)	O (Index Search)
	PULSE	Frame by Frame Mode [VT-FX440E(UK)] Tracking Mode [VT-X410E(UK)]	Frame by Frame Mode [VT-FX340E(UK)] Tracking Mode [VT-MX310E(UK)]	Frame by Frame Mode

2-2-2 Comparison of Main Control ICs

← : Same as on left

ITEM	VT-FX440E(UK)/MX410E(UK)	VT-FX340E(UK)/MX310E(UK)
IF SIGNAL PROCESS	MSP3407G-QG-B8 (V3)	MSP3407G-QG-B8 / MSP3417G-QG-B8-V3 (V3)
ERROR VOLTAGE DET	LTV-817(B,C)-F (IC001)	←
SWITCHING	CD4052BCSJX / BU4052BCF-E2 / TC4052BF(EL) (IC151)	←
VIDEO/AUDIO SIGNAL PROCESS/ HEAD AMP	LA71750EM-MPB-E (IC301)	LA71750AM-MPB (IC301)
Hi-Fi AUDIO SIGNAL PROCESS	LA72648M-MPB-E (IC451)	LA72648M (IC451)
MICROCONTROLLER 8BIT SERVO/SYSTEM CONTROL	M3776AMCA-AA5GP (IC501)	M37762MCA-ACPGP / QSZAB0RMB168 (IC501)
MEMORY	CAT24WC02JI / BR24L02F-WE2 (IC503)	CAT24WC02JI / BR24C02F-W (IC503)
LED DISPLAY DRIVE	PT6958-FN-TP (IC561)	←
VPS	LC74793JM-TRM (IC640)	←

← : Same as on left

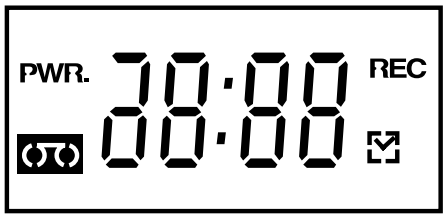
ITEM	VT-FX540E(UK)		VT-FX440E(UK)	
IF SIGNAL PROCESS	MSP3417G-QG-B8	(IC1)	←	
ERROR VOLTAGE DET	LTV-817(B,C)-F	(IC001)	←	
VIDEO/AUDIO SIGNAL PROCESS/ HEAD AMP	LA71750EM-MPB-E	(IC301)	←	
Hi-Fi AUDIO SIGNAL PROCESS	LA72648M-MPB-E	(IC451)	←	
MICROCONTROLLER 8BIT SERVO/SYSTEM CONTROL	M3776AMCA-AB5GP	(IC501)	M3776AMCA-AA5GP	(IC501)
MEMORY	CAT24WC02JI / BR24L02F-WE2	(IC503)	←	
LED DISPLAY DRIVE	PT6958-FN-TP	(IC561)	←	
VPS	LC74793JM-TRM	(IC640)	←	

2-3 FUNCTION INDICATOR SYMBOLS

Note:

The following symbols will appear on the indicator panel to indicate the current mode or operation of the VCR. On-screen modes will also be momentarily displayed on the tv screen when you press the operation buttons.

Display panel



MODE	INDICATOR ACTIVE	
POWER ON	" PWR."	ON
CASSETTE "IN" CASSETTE "OUT"	" " " "	ON OFF
CLOCK	" 88:88 "	ON
REC	" REC "	ON
REC PAUSE	" REC "	Blinks at 0.8Hz interval
PLAY*	" PLAY " is displayed on the indicator panel.	
FF*	" FF " is displayed on the indicator panel.	
REW*	" Fr " is displayed on the indicator panel.	
RESIDUAL QUANTITY*	A residual quantity value of tape is displayed on the indicator panel. (in a FF/REW mode)	
REMAIN*	A remain value of tape is displayed on a display panel by 7 segment indication.	
T-REC,OTR	" "	ON (T-REC OFF,T-REC incomplete Blinks at 0.8Hz interval)
RF OUT	RF out channel number is displayed on the indicator panel.	
S-INH condition	All modes	Blinks at 0.8Hz interval
All lighting mode	All characters	ON
When reel and capstan mechanism is not functioning correctly	"▲ R" is displayed on a TV screen. (Refer to Fig. 1.)	
When tape loading mechanism is not functioning correctly	"▲ T" is displayed on a TV screen. (Refer to Fig. 2.)	
When cassette loading mechanism is not functioning correctly	"▲ C" is displayed on a TV screen. (Refer to Fig. 3.)	
When the drum is not working properly	"▲ D" is displayed on a TV screen. (Refer to Fig. 4.)	
P-ON Power safety detection	"▲ P" is displayed on a TV screen. (Refer to Fig. 5.)	

*Not applicable to VT-FX540E(UK)

TV screen

Note:

OSD for mechanical error will be displayed for 5 sec. after the mechanical error occurs.

When reel and capstan mechanism is not functioning correctly

Fig. 1

When tape loading mechanism is not functioning correctly

Fig. 2

When cassette loading mechanism is not functioning correctly

Fig. 3

When the drum is not working properly

Fig. 4

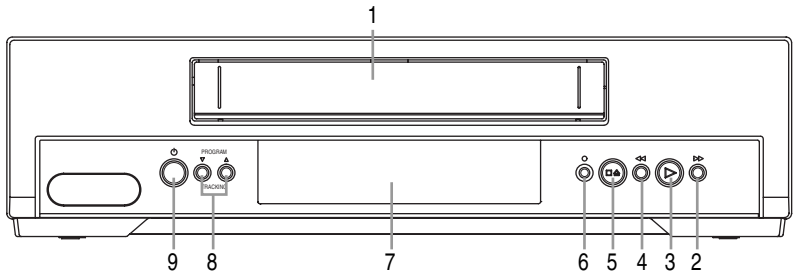
P-ON Power safety detection

Fig. 5

2-4 OPERATING CONTROLS AND FUNCTIONS

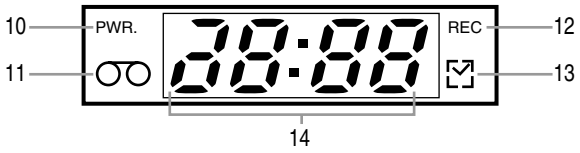
[VT-FX440E(UK)]

Front Panel



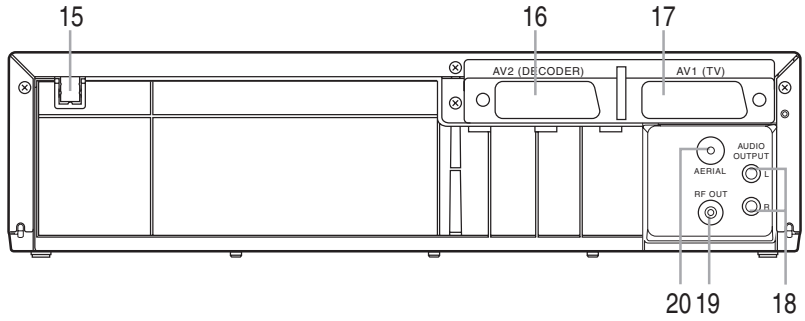
1. Cassette compartment
2. ▶▶ (F.FWD) button
3. ▶ (PLAY) button
4. ◀◀ (REW) button
5. ■ ⏏ (STOP/EJECT) button
6. ● (REC/OTR) button
7. Indicator (See below)
8. PROGRAM (▲/▼) [TRACKING] buttons
9. ⏻ (OPERATE) button

Indicator



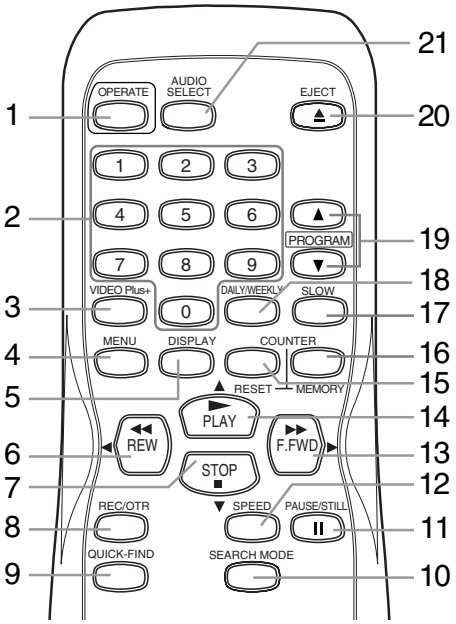
10. PWR. (Power) indicator
11. TAPE IN indicator
12. REC indicator
13. ⏲ (Timer) indicator
14. CLOCK indicator

Rear Panel



15. Power cord
16. AV2 (DECODER) socket
17. AV1 (TV) socket
18. AUDIO OUTPUT L/R jacks
19. RF OUT socket
20. AERIAL socket

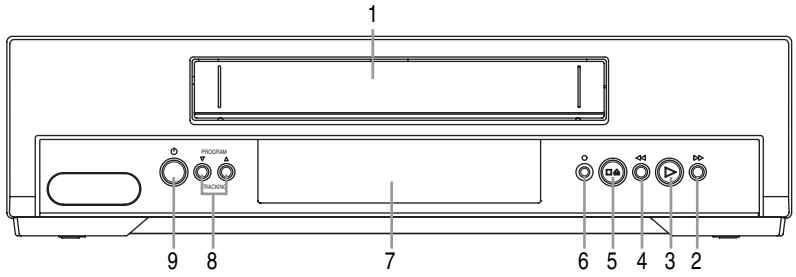
Remote Controller



1. OPERATE button
2. NUMBER buttons
3. VIDEO Plus+ button
4. MENU button
5. DISPLAY button
6. REW/◀ button
7. STOP/▼ button
8. REC/OTR button
9. QUICK-FIND button
10. SEARCH MODE button
11. PAUSE/STILL button
12. SPEED button
13. F.FWD/▶ button
14. PLAY/▲ button
15. COUNTER RESET button
16. COUNTER MEMORY button
17. SLOW button
18. DAILY/WEEKLY button
19. PROGRAM (▲/▼) buttons
20. EJECT button
21. AUDIO SELECT button

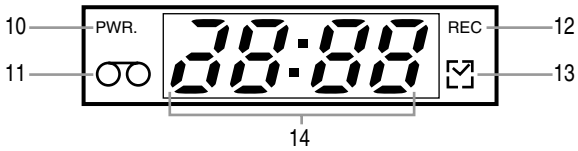
[VT-MX410E(UK)]

Front Panel



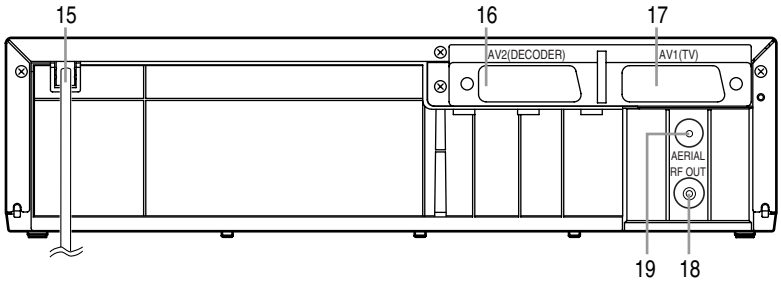
1. Cassette compartment
2. ▶▶ (F.FWD) button
3. ▶ (PLAY) button
4. ◀◀ (REW) button
5. ■ ▲ (STOP/EJECT) button
6. ● (REC/OTR) button
7. Indicator (See below)
8. PROGRAM (▲/▼) [TRACKING] buttons
9. ⏻ (OPERATE) button

Indicator



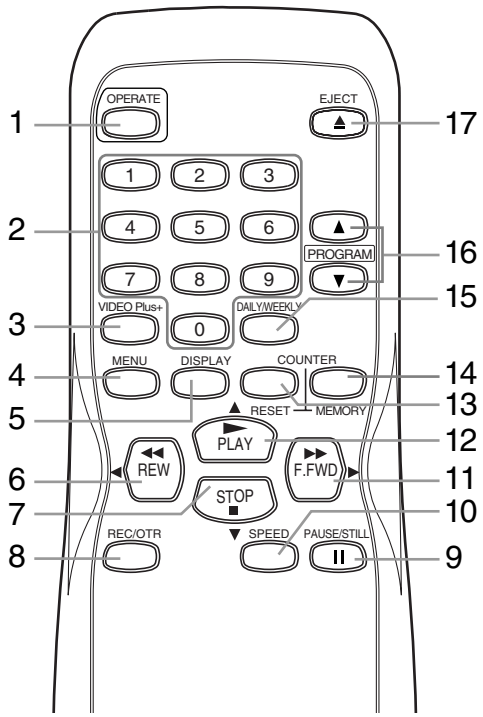
10. PWR. (Power) indicator
11. TAPE IN indicator
12. REC indicator
13. ⏲ (Timer) indicator
14. CLOCK indicator

Rear Panel



15. Power cord
16. AV2 (DECODER) socket
17. AV1 (TV) socket
18. RF OUT socket
19. AERIAL socket

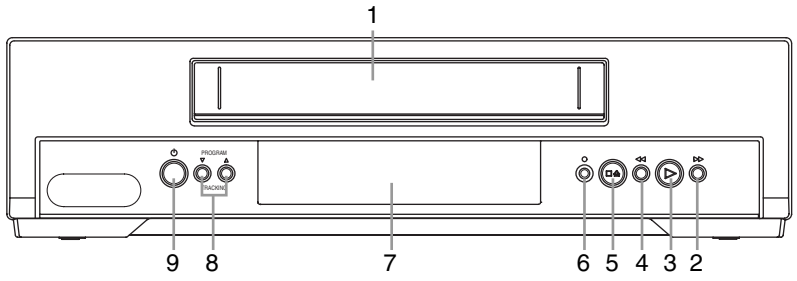
Remote Controller



1. OPERATE button
2. NUMBER buttons
3. VIDEO Plus+ button
4. MENU button
5. DISPLAY button
6. REW/◀ button
7. STOP/▼ button
8. REC/OTR button
9. PAUSE/STILL button
10. SPEED button
11. F.FWD/▶ button
12. PLAY/▲ button
13. COUNTER RESET button
14. COUNTER MEMORY button
15. DAILY/WEEKLY button
16. PROGRAM (▲/▼) buttons
17. EJECT button

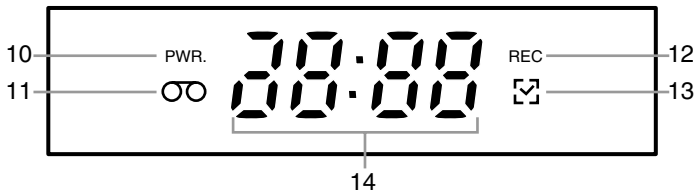
[VT-FX540E(UK)]

Front Panel



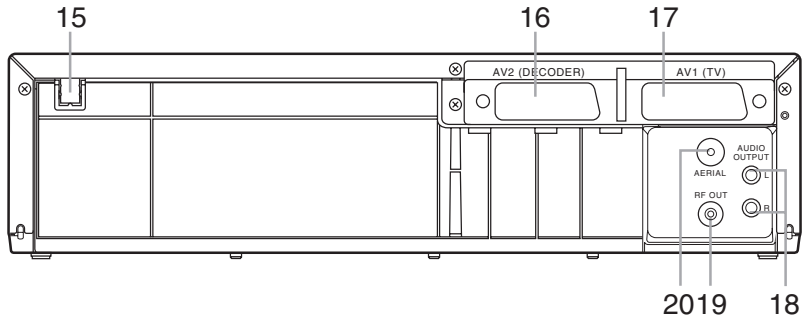
1. Cassette compartment
2. ▶▶ (F.FWD) button
3. ▶ (PLAY) button
4. ◀◀ (REW) button
5. ■ ▲ (STOP/EJECT) button
6. ● (REC/OTR) button
7. Indicator (See below)
8. PROGRAM (▲/▼) [TRACKING] buttons
9. ⏻ (OPERATE) button

Indicator



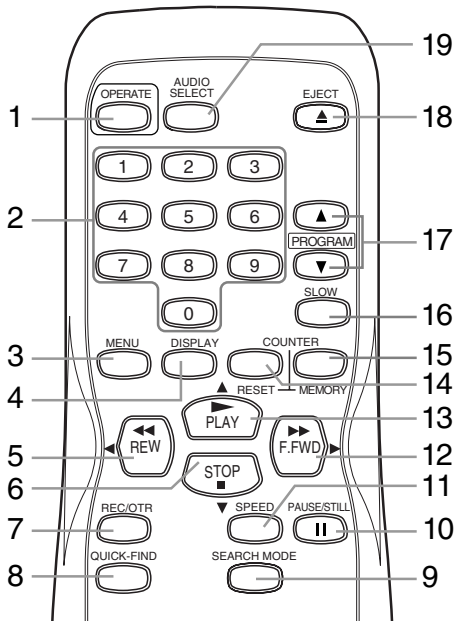
10. PWR. (Power) indicator
11. TAPE IN indicator
12. REC indicator
13. ⏲ (Timer) indicator
14. CLOCK indicator

Rear Panel



15. Power cord
16. AV2 (DECODER) socket
17. AV1 (TV) socket
18. AUDIO OUTPUT L/R jacks
19. RF OUT socket
20. AERIAL socket

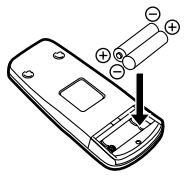
Remote Controller



1. OPERATE button
2. NUMBER buttons
3. MENU button
4. DISPLAY button
5. REW/◄ button
6. STOP/▼ button
7. REC/OTR button
8. QUICK-FIND button
9. SEARCH MODE button
10. PAUSE/STILL button
11. SPEED button
12. F.FWD/► button
13. PLAY/▲ button
14. COUNTER RESET button
15. COUNTER MEMORY button
16. SLOW button
17. PROGRAM (▲/▼) buttons
18. EJECT button
19. AUDIO SELECT button

To insert the batteries:

Install two AA batteries matching the polarity indicated inside the battery compartment.



CAUTION

On Battery Replacement

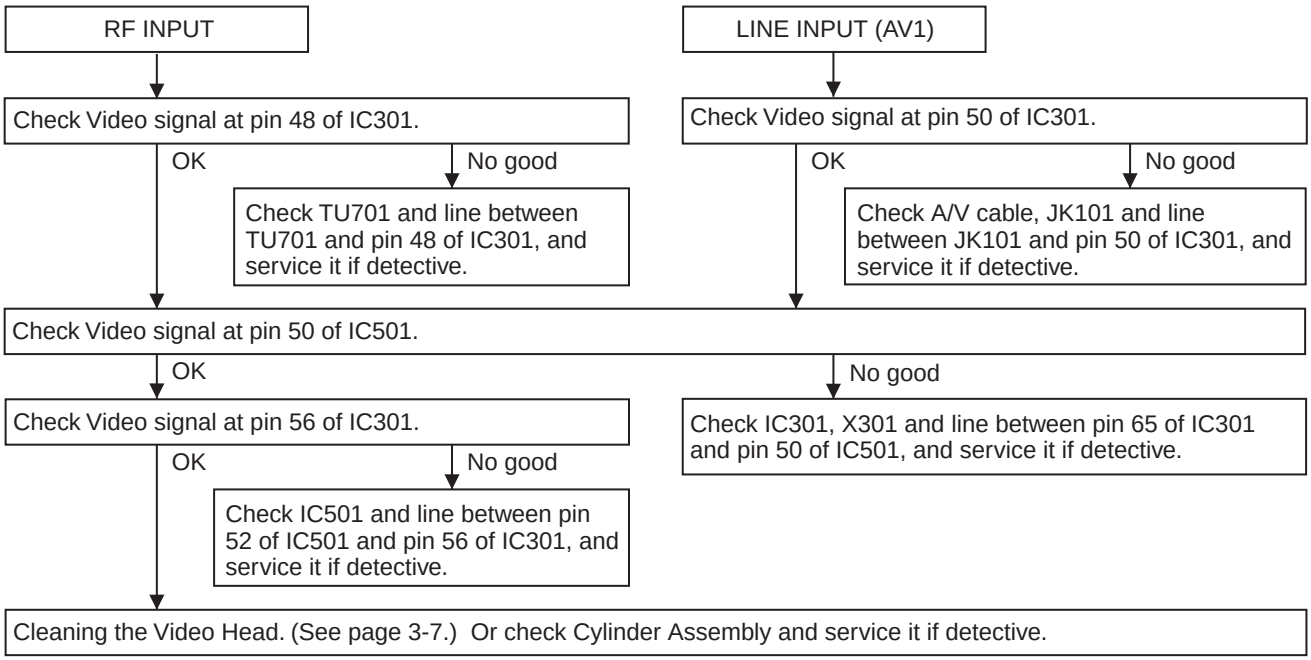
- Do not mix old and new batteries. (Also never mix alkaline batteries with manganese batteries.)

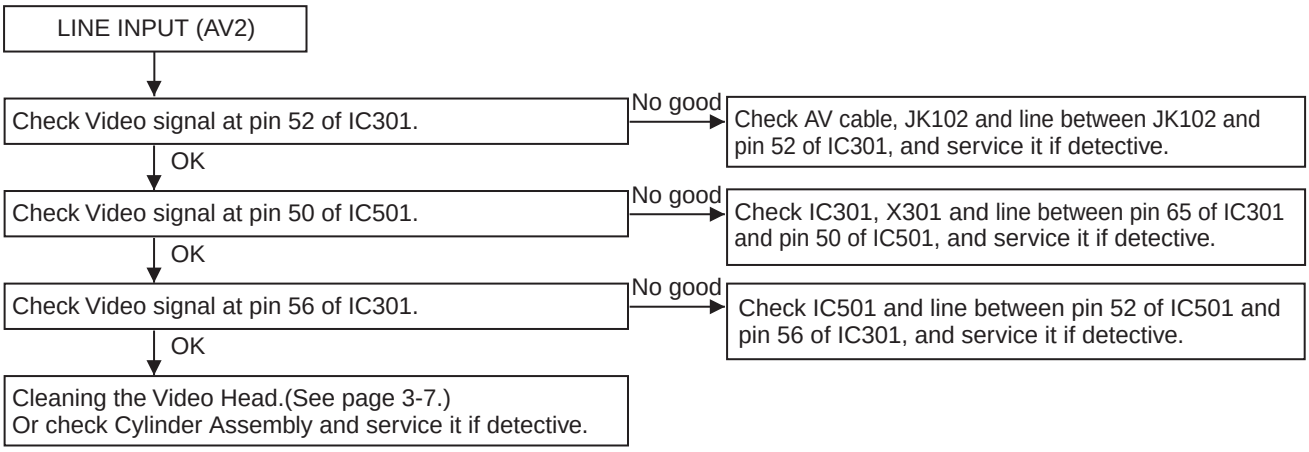
3 MAINTENANCE AND INSPECTION

3-1 TROUBLESHOOTING

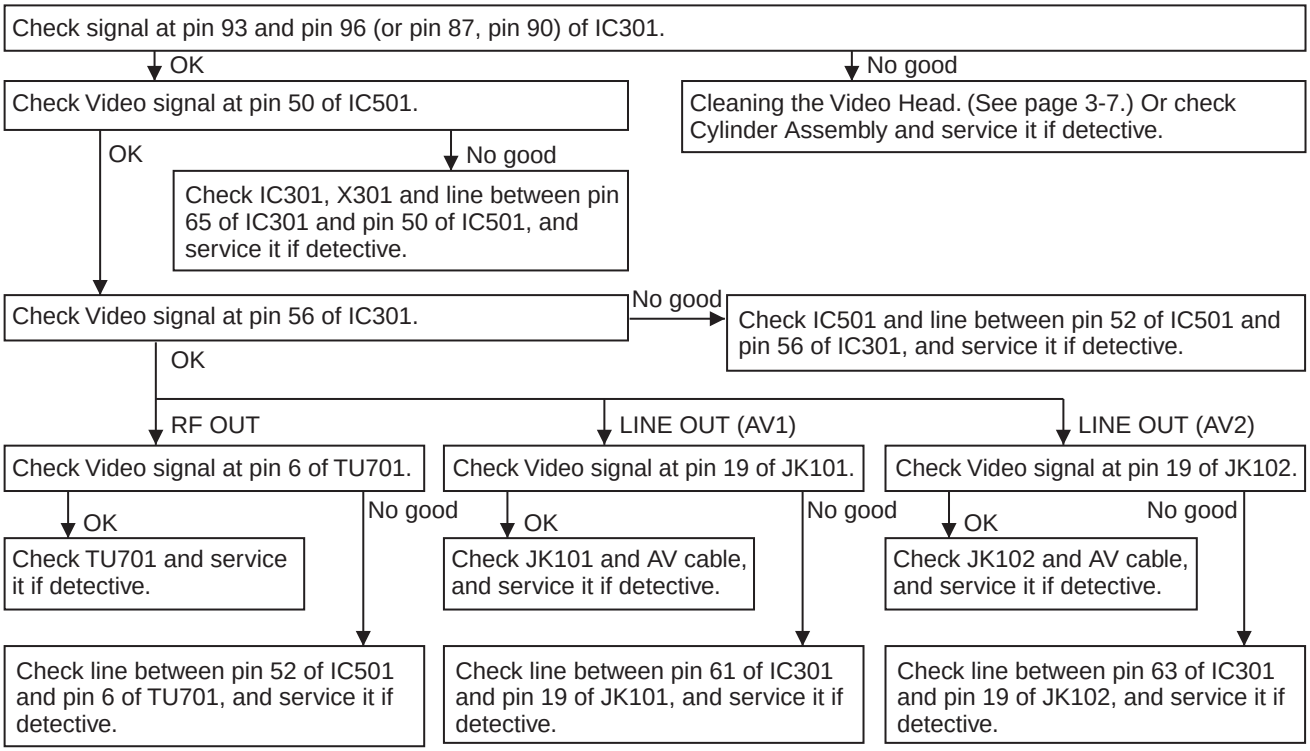
This section decribes how to service for specific malfunctions or poor parts.
Detect malfunction or poor parts and service as follows:

Video problem 1 (No recording Video)

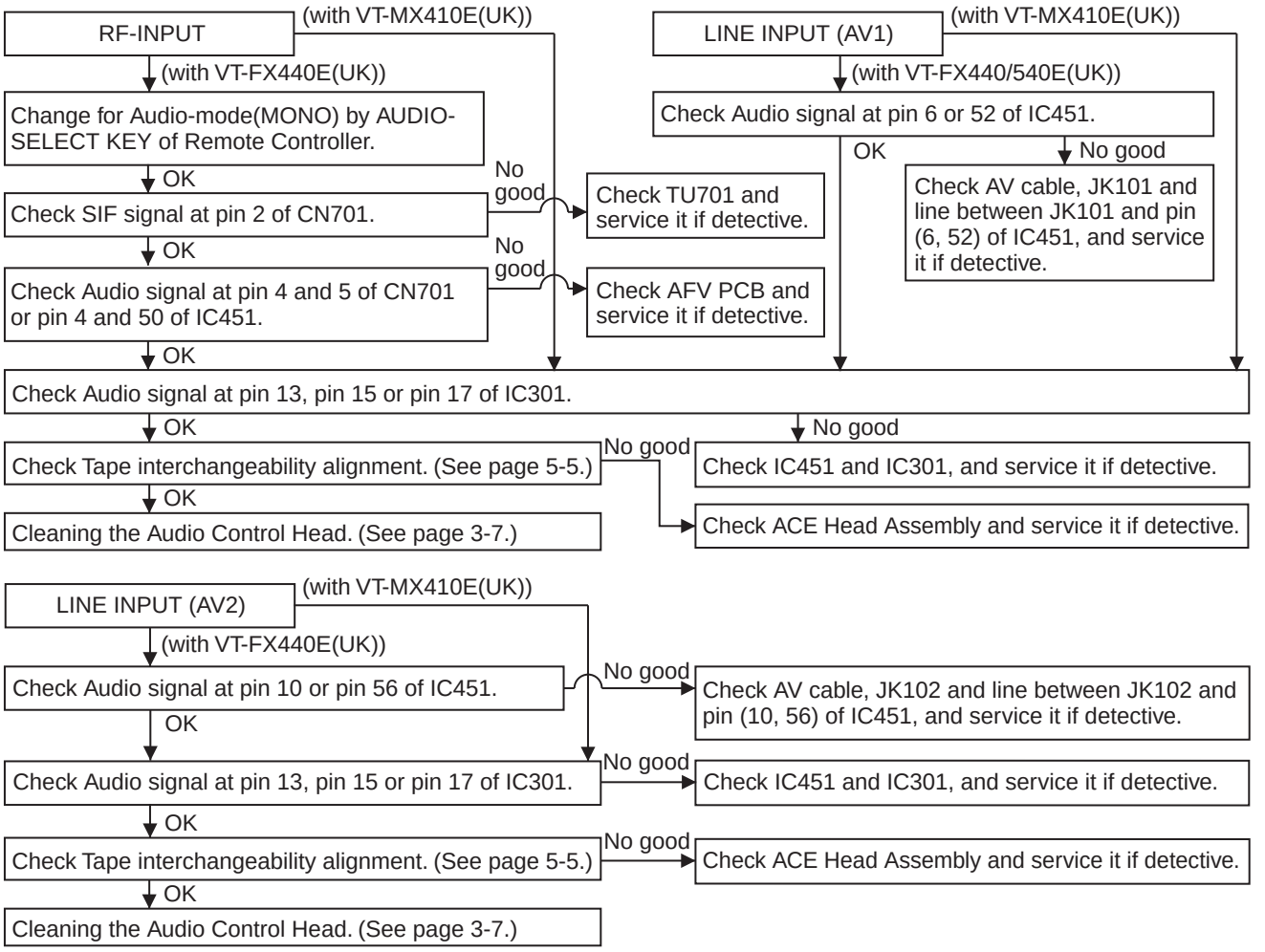

RF INPUT
LINE INPUT (AV1)
Check Video signal at pin 48 of IC301.
Check Video signal at pin 50 of IC301.
OK
No good
Check TU701 and line between TU701 and pin 48 of IC301, and service it if detective.
Check A/V cable, JK101 and line between JK101 and pin 50 of IC301, and service it if detective.
Check Video signal at pin 50 of IC501.
OK
No good
Check Video signal at pin 56 of IC301.
Check IC301, X301 and line between pin 65 of IC301 and pin 50 of IC501, and service it if detective.
OK
No good
Check IC501 and line between pin 52 of IC501 and pin 56 of IC301, and service it if detective.
Cleaning the Video Head. (See page 3-7.) Or check Cylinder Assembly and service it if detective.


LINE INPUT (AV2)
Check Video signal at pin 52 of IC301.
No good
Check AV cable, JK102 and line between JK102 and pin 52 of IC301, and service it if detective.
OK
Check Video signal at pin 50 of IC501.
No good
Check IC301, X301 and line between pin 65 of IC301 and pin 50 of IC501, and service it if detective.
OK
Check Video signal at pin 56 of IC301.
No good
Check IC501 and line between pin 52 of IC501 and pin 56 of IC301, and service it if detective.
OK
Cleaning the Video Head.(See page 3-7.)
Or check Cylinder Assembly and service it if detective.

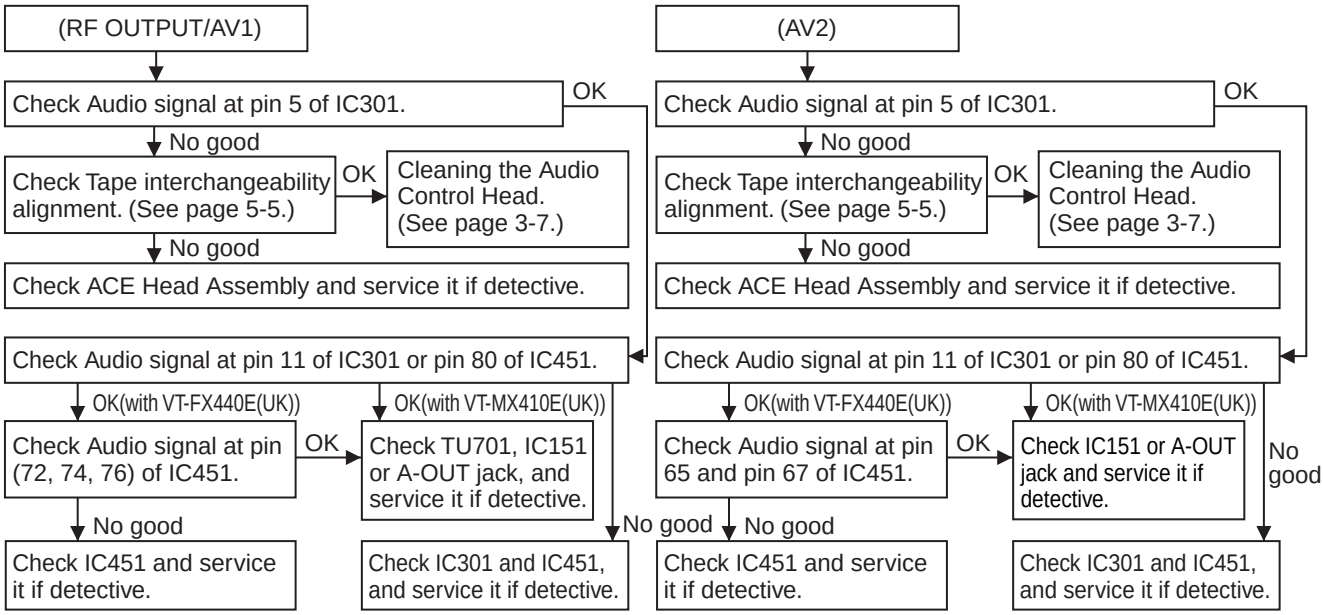
Video problem 2 (No playback Video)


Check signal at pin 93 and pin 96 (or pin 87, pin 90) of IC301.
OK
No good
Check Video signal at pin 50 of IC501.
Cleaning the Video Head. (See page 3-7.) Or check Cylinder Assembly and service it if detective.
OK
No good
Check IC301, X301 and line between pin 65 of IC301 and pin 50 of IC501, and service it if detective.
Check Video signal at pin 56 of IC301.
No good
Check IC501 and line between pin 52 of IC501 and pin 56 of IC301, and service it if detective.
OK
RF OUT
LINE OUT (AV1)
LINE OUT (AV2)
Check Video signal at pin 6 of TU701.
Check Video signal at pin 19 of JK101.
Check Video signal at pin 19 of JK102.
OK
No good
OK
No good
OK
No good
Check TU701 and service it if detective.
Check JK101 and AV cable, and service it if detective.
Check JK102 and AV cable, and service it if detective.
Check line between pin 52 of IC501 and pin 6 of TU701, and service it if detective.
Check line between pin 61 of IC301 and pin 19 of JK101, and service it if detective.
Check line between pin 63 of IC301 and pin 19 of JK102, and service it if detective.

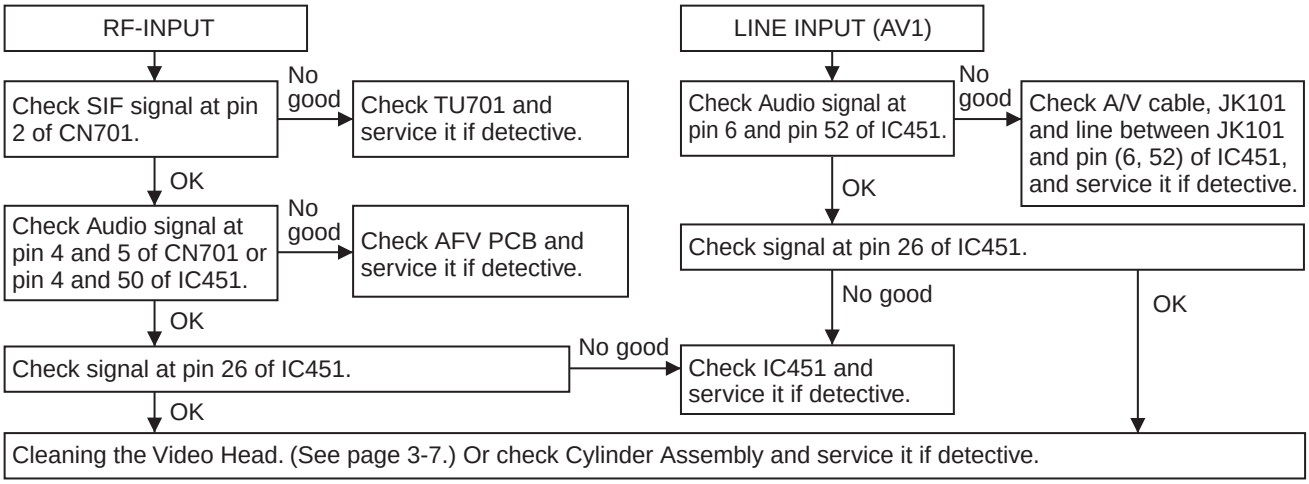
Audio problem 1 (No recording Normal Audio)

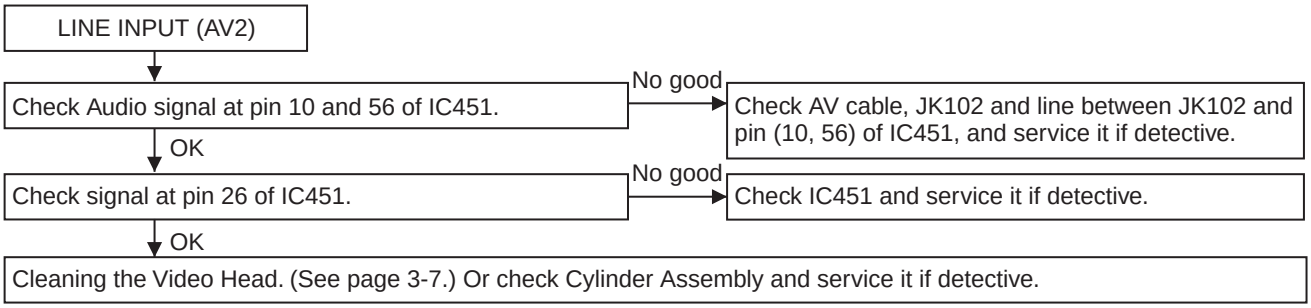

RF-INPUT
(with VT-MX410E(UK))
(with VT-FX440E(UK))
Change for Audio-mode(MONO) by AUDIO-SELECT KEY of Remote Controller.
OK
Check SIF signal at pin 2 of CN701.
No good
Check TU701 and service it if detective.
OK
Check Audio signal at pin 4 and 5 of CN701 or pin 4 and 50 of IC451.
No good
Check AFV PCB and service it if detective.
OK
LINE INPUT (AV1)
(with VT-MX410E(UK))
(with VT-FX440/540E(UK))
Check Audio signal at pin 6 or 52 of IC451.
OK
No good
Check AV cable, JK101 and line between JK101 and pin (6, 52) of IC451, and service it if detective.
Check Audio signal at pin 13, pin 15 or pin 17 of IC301.
OK
No good
Check Tape interchangeability alignment. (See page 5-5.)
No good
Check IC451 and IC301, and service it if detective.
OK
Cleaning the Audio Control Head. (See page 3-7.)
Check ACE Head Assembly and service it if detective.
LINE INPUT (AV2)
(with VT-MX410E(UK))
(with VT-FX440E(UK))
Check Audio signal at pin 10 or pin 56 of IC451.
No good
Check AV cable, JK102 and line between JK102 and pin (10, 56) of IC451, and service it if detective.
OK
Check Audio signal at pin 13, pin 15 or pin 17 of IC301.
No good
Check IC451 and IC301, and service it if detective.
OK
Check Tape interchangeability alignment. (See page 5-5.)
No good
Check ACE Head Assembly and service it if detective.
OK
Cleaning the Audio Control Head. (See page 3-7.)

Audio problem 2 (No playback Normal Audio)

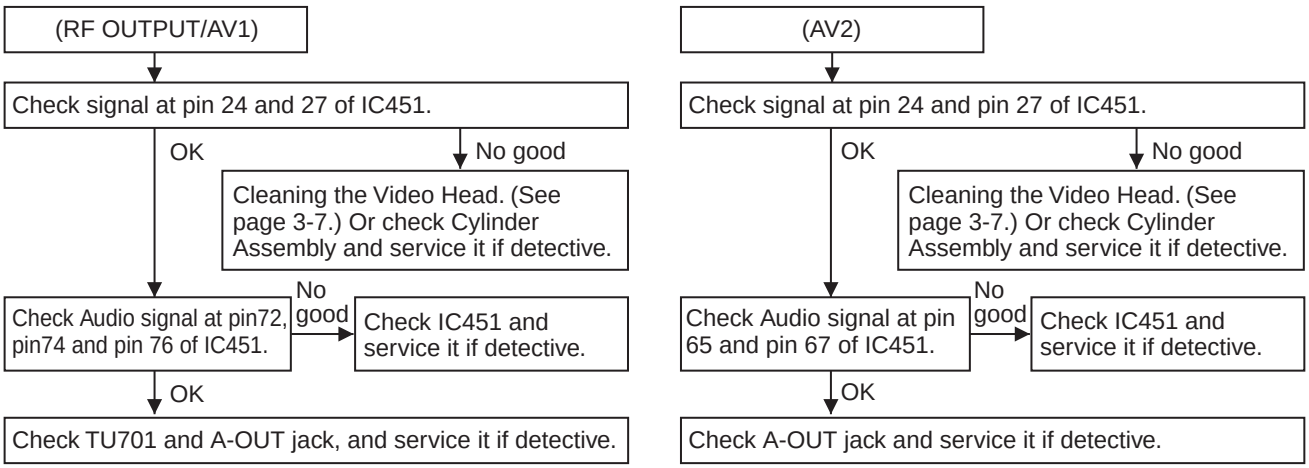

(RF OUTPUT/AV1)
Check Audio signal at pin 5 of IC301.
OK
No good
Check Tape interchangeability alignment. (See page 5-5.)
OK
Cleaning the Audio Control Head. (See page 3-7.)
No good
Check ACE Head Assembly and service it if detective.
Check Audio signal at pin 11 of IC301 or pin 80 of IC451.
OK(with VT-FX440E(UK))
OK(with VT-MX410E(UK))
Check Audio signal at pin (72, 74, 76) of IC451.
OK
Check TU701, IC151 or A-OUT jack, and service it if detective.
No good
Check IC451 and service it if detective.
No good
Check IC301 and IC451, and service it if detective.
(AV2)
Check Audio signal at pin 5 of IC301.
OK
No good
Check Tape interchangeability alignment. (See page 5-5.)
OK
Cleaning the Audio Control Head. (See page 3-7.)
No good
Check ACE Head Assembly and service it if detective.
Check Audio signal at pin 11 of IC301 or pin 80 of IC451.
OK(with VT-FX440E(UK))
OK(with VT-MX410E(UK))
Check Audio signal at pin 65 and pin 67 of IC451.
OK
Check IC151 or A-OUT jack and service it if detective.
No good
No good
Check IC451 and service it if detective.
No good
Check IC301 and IC451, and service it if detective.

Audio problem 3 (No recording Hi-Fi Audio (with VT-FX440E(UK), VT-FX540E(UK))


RF-INPUT
Check SIF signal at pin 2 of CN701.
No good
Check TU701 and service it if detective.
OK
Check Audio signal at pin 4 and 5 of CN701 or pin 4 and 50 of IC451.
No good
Check AFV PCB and service it if detective.
OK
Check signal at pin 26 of IC451.
No good
Check IC451 and service it if detective.
OK
Cleaning the Video Head. (See page 3-7.) Or check Cylinder Assembly and service it if detective.
LINE INPUT (AV1)
Check Audio signal at pin 6 and pin 52 of IC451.
No good
Check A/V cable, JK101 and line between JK101 and pin (6, 52) of IC451, and service it if detective.
OK
Check signal at pin 26 of IC451.
No good
OK

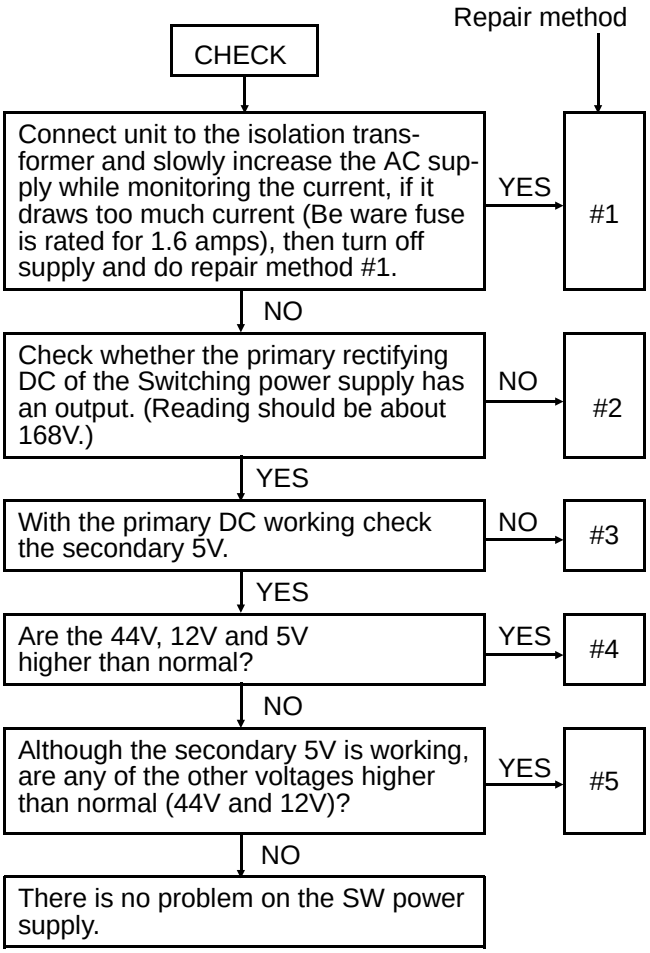

LINE INPUT (AV2)
Check Audio signal at pin 10 and 56 of IC451.
No good
Check AV cable, JK102 and line between JK102 and pin (10, 56) of IC451, and service it if detective.
OK
Check signal at pin 26 of IC451.
No good
Check IC451 and service it if detective.
OK
Cleaning the Video Head. (See page 3-7.) Or check Cylinder Assembly and service it if detective.

Audio problem 4 (No playback Hi-Fi Audio (with VT-FX440E(UK), VT-FX540E(UK))


(RF OUTPUT/AV1)
Check signal at pin 24 and 27 of IC451.
OK
No good
Cleaning the Video Head. (See page 3-7.) Or check Cylinder Assembly and service it if detective.
Check Audio signal at pin72, pin74 and pin 76 of IC451.
No good
Check IC451 and service it if detective.
OK
Check TU701 and A-OUT jack, and service it if detective.
(AV2)
Check signal at pin 24 and pin 27 of IC451.
OK
No good
Cleaning the Video Head. (See page 3-7.) Or check Cylinder Assembly and service it if detective.
Check Audio signal at pin 65 and pin 67 of IC451.
No good
Check IC451 and service it if detective.
OK
Check A-OUT jack and service it if detective.

Power problem

It is highly recommended that a variable isolation transformer which can monitor current be used. (Alternatively a variable AC source which monitors current will do). Read directions below before power is added!


Repair method
CHECK
Connect unit to the isolation transformer and slowly increase the AC supply while monitoring the current, if it draws too much current (Be ware fuse is rated for 1.6 amps), then turn off supply and do repair method #1.
YES
#1
NO
Check whether the primary rectifying DC of the Switching power supply has an output. (Reading should be about 168V.)
NO
#2
YES
With the primary DC working check the secondary 5V.
NO
#3
YES
Are the 44V, 12V and 5V higher than normal?
YES
#4
NO
Although the secondary 5V is working, are any of the other voltages higher than normal (44V and 12V)?
YES
#5
NO
There is no problem on the SW power supply.

Repair method #1

(Power must be off)
Short circuit in the secondary side. check diode D014, D011, D012, D013, switching FET (Q001), control transistor (Q002), diode (D006), and resistor (R014) replace as necessary.
Disconnect 44V diode (D011), 12V diode (D013), 5V diode (D014). Check the load continuity of 44V line, 12V line and 5V line through a tester (resistance range).
If the tester indicates a lower resistance value around 0 ohm, the line is short-circuited.
Before repairing the switching power supply, find out the short-circuited area of such line and repair it.
If the tester does not indicate any low resistance value (around 0 ohm), no load is short-circuited and there is no problem.

1] Check for any defective parts while the secondary rectifying diodes are disconnected (D011, D013 and D014) perform a diode check in both forward and reverse directions through a tester.

2] Remove the following components and check for defects: snubber diode (D005), switching FET (Q001), source resistor (R006), control transistor (Q002).

Repair method #2

Check the fuse 1.6A (F001), primary rectifying diodes (D001-D004) as possible problems. Remove the above mentioned parts and check them. The circuit which turns on switching FET (Q001) may be regarded as a possible cause, even if the load at the secondary side is shorted, it can't be detected because switching FET (Q001) isn't operating. Perform check according to the step 1 and 2 of repair method #1 and check the following parts:
(Remove the part from PCB)
Switching FET (Q001), source resistor (R006), gate resistor (R008) and start resistor (R003, R004, R005 and R028).

Repair method #3

A circuit to turn on switching FET (Q001) may not work and this may be regarded as a cause of trouble. Even if the load at the secondary side is short-circuited, it cannot be detected because switching FET (Q001) does not turn on. Therefore, perform check according to the steps 1] and 2] of the repair method #1 and execute the under-mentioned parts breakage check.
(Remove the part from PCB.)
switching FET (Q001), source resistor (R006), control transistor (Q002), gate resistor (R008) and start resistor (R003, R004, R005 and R028).

Repair method #4

The feedback circuit which is monitored by the output of voltage may not work and this may be regarded as a possible cause, remove control transistor Q002 and check for defects. More over, a photo coupler (IC001) and transistor (Q004) may be defective, replace any defective parts with factory originals.

Repair method #5

If the output voltage of the secondary side is slightly high, the line load may be in the "OPEN" state and this may be regarded as a cause of trouble. If there is no output voltage on the secondary side, the rectifying diodes (D014) and (D015) may be defective.

3-2 STANDARD MAINTENANCE

3-2-1 Service Schedule of Components

This maintenance chart shows the standard for the replacement and cleaning time of each part.
Parts may be replaced depending on environment and purpose for use, use the chart for reference.

H: Hours ○: Cleaning ●: Replace

Deck		Periodic Service Schedule			
Ref.No.	**Part Name**	**1,000 H**	**2,000 H**	**3,000 H**	**4,000 H**
B2	Cylinder Assembly	○	●	○	●
B3	Loading Motor Assembly			●	
B8	Pulley Assembly		●		●
B587	Tension Lever Assembly		●		●
B31	ACE Head Assembly			●	
B573, B574	Reel (SP)(D2), Reel (TU)(D2)			●	
B37	Capstan Motor		●		●
B52	Cap Belt		●		●
B73	FE Head			●	
B133, B134	Idler Gear, Idler Arm		●		●
B410	Pinch Arm(A) Assembly		●		●
B414	M Brake (SP) Assembly		●		●
B416	M Brake (TU) Assembly		●		●
B525	LDG Belt		●		●
B569 (2 head only)	Cam Holder		●		●
B593 (4 head, 4 head HiFi only)	Cam Holder Assembly		●		●

Notes:

1. Clean all parts for the tape transport (Upper Drum with Video Head / Pinch Roller / ACE Head / FE Head) using 90% lsopropyl Alcohol.
2. After cleaning the parts, do all DECK ADJUSTMENTS.
3. For the reference numbers listed above, refer to Deck Exploded Views.

3-2-2 Cleaning

Cleaning of Video Head

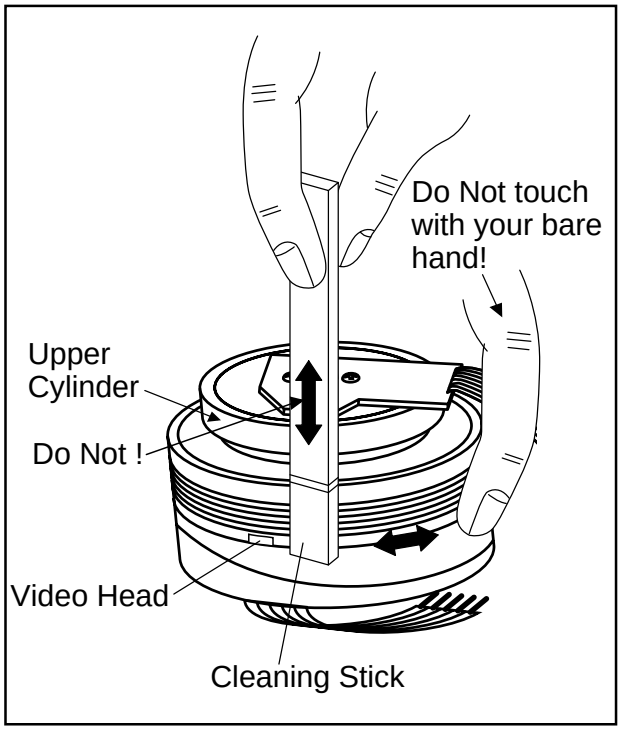
Clean the head with a head cleaning stick or chamois cloth.

Procedure

1. Remove the top cabinet.
2. Put on a glove (thin type) to avoid touching the upper and lower drum with your bare hand.
3. Put a few drops of 90% Isopropyl alcohol on the head cleaning stick or on the chamois cloth and, by slightly pressing it against the head tip, turn the upper drum to the right and to the left.

Notes:

1. The video head surface is made of very hard material, but since it is very thin, avoid cleaning it vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit.
3. Do not reuse a stained head cleaning stick or a stained chamois cloth.



Cleaning of ACE Head

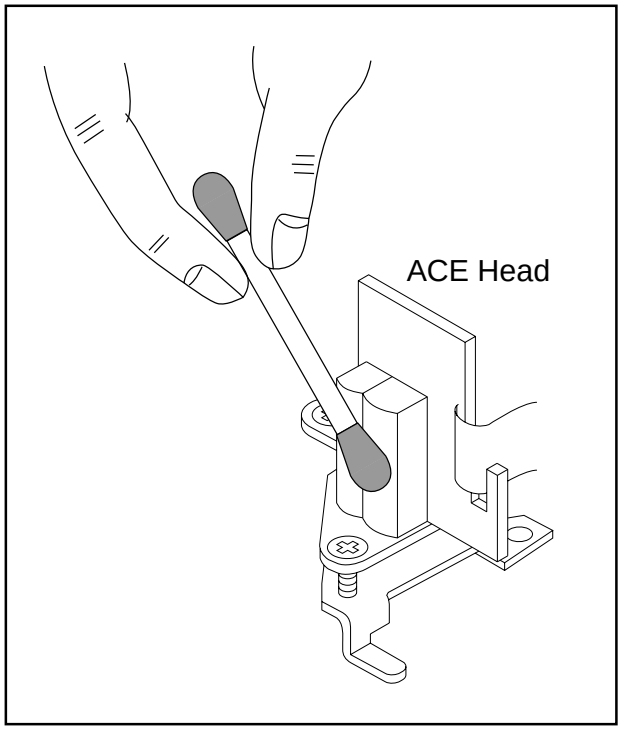
Clean the head with a cotton swab.

Procedure

1. Remove the top cabinet.
2. Dip the cotton swab in 90% isopropyl alcohol and clean the ACE Head. Be careful not to damage the upper drum and other tape running parts.

Notes:

1. Avoid cleaning the ACE Head vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit or damage may occur.

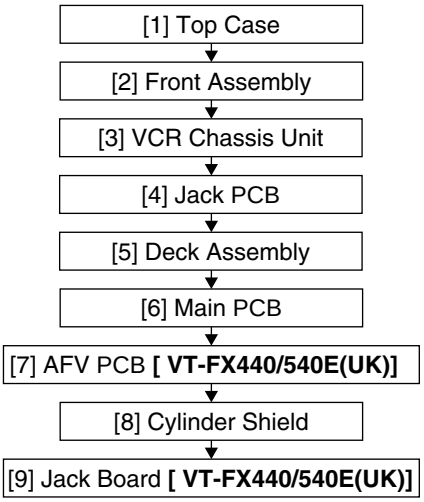


4 DISASSEMBLY

4-1 CABINET DISASSEMBLY INSTRUCTIONS

4-1-1 Disassembly Flowchart

This flowchart indicates the disassembly steps to gain access to item(s) to be serviced. When reassembling, follow the steps in reverse order. Bend, route, and dress the cables as they were originally.



4-1-2. Disassembly Method

ID/ LOC. No.	PART	REMOVAL		
		Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	Note
[1]	Top Case	4-1-1	7(S-1)	-
[2]	Front Assembly	4-1-2	*3(L-1),*4(L-2)	-
[3]	VCR Chassis Unit	4-1-3A 4-1-3B	5(S-2), 3(S-3)--[VT-FX440/540E(UK)] 2(S-3) --- [VT-MX410E(UK)], (S-4)	1
[4]	Jack PCB	4-1-4	*Desolder, (S-5)	-
[5]	Deck Assembly	4-1-5 4-1-6	2(S-6), *Desolder	2,3
[6]	Main PCB	4-1-5	*(L-3) --- [VT-FX440/540E(UK)]	-
[7]	AFV PCB	4-1-5	Desolder [VT-FX440/540E(UK)]	-
[8]	Cylinder Shield	4-1-5	2(S-7)	-
[9]	Sub Jack PCB	4-1-5	Jack Board, *Desolder [VT-FX440/540E(UK)]	
		↓ (3)	↓ (4)	↓ (5)

(1): Identification (location) No. of parts in the figures

(2): Name of the part

(3): Figure Number for reference

(4): Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, L=Locking Tab, S=Screw,
CN=Connector
*=Unhook, Unlock, Release, Unplug, or Desolder
e.g. 2(S-2) = two Screws (S-2),
2(L-2) = two Locking Tabs (L-2)

(5): Refer to “Reference Notes.”

Reference Notes

CAUTION: Locking Tabs (L-1) and (L-2) are fragile. Be careful not to break them.

1. Remove five Screws (S-2), two Screws (S-3) and Screw (S-4). Then, slowly lift the VCR Chassis Unit (Deck Assembly, Jack PCB and Main PCB) up.
2. When reassembling, solder wire jumpers as shown in Fig. 4-1-5.
3. Before installing the Deck Assembly, be sure to place the pin of LD-SW on Main PCB as shown in Fig. 4-1-6. Then, install the Deck Assembly while aligning the hole of Cam Gear with the pin of LD-SW, the shaft of Cam Gear with the hole of LD-SW as shown in Fig. 4-1-6.

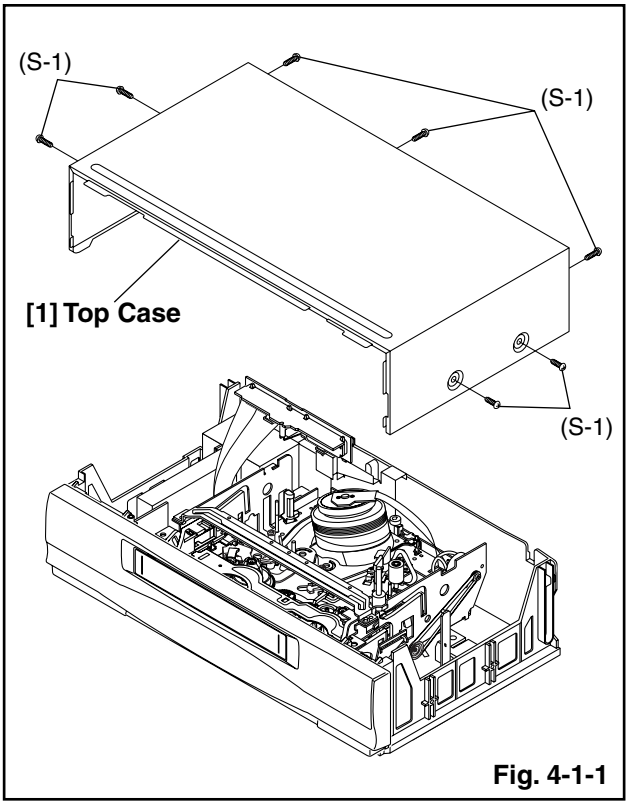


Fig. 4-1-1

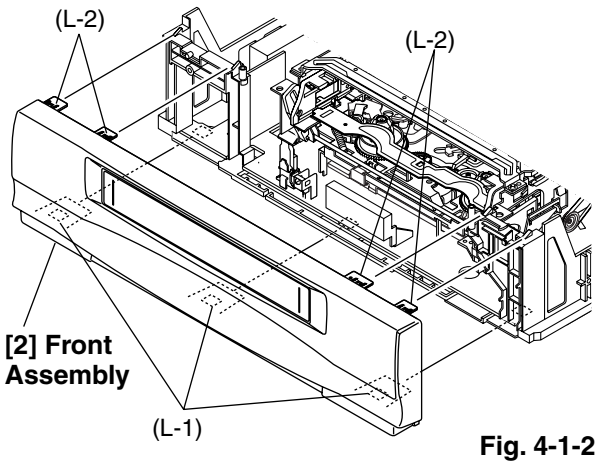


Fig. 4-1-2

[VT-FX440/540E(UK)]

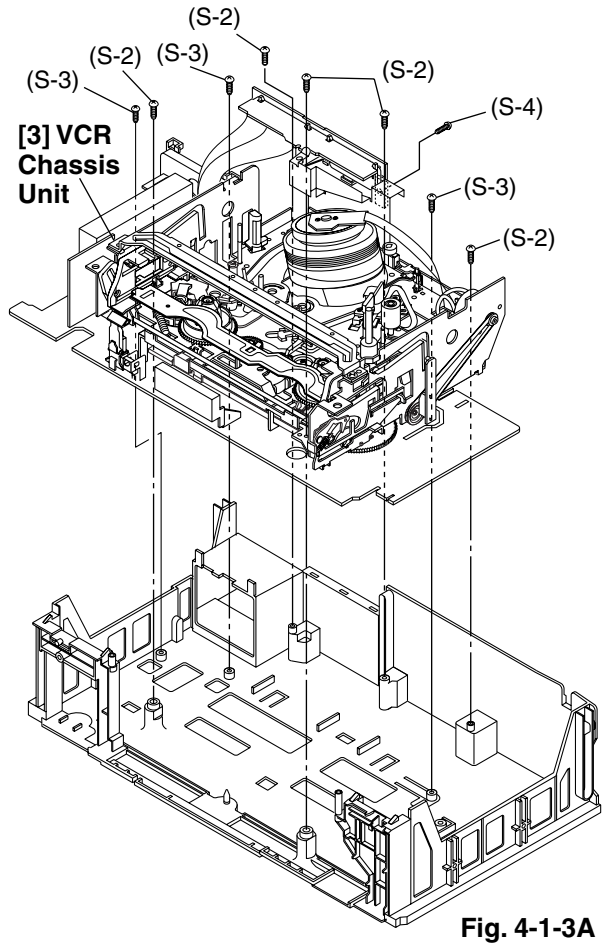


Fig. 4-1-3A

[VT-MX410E(UK)]

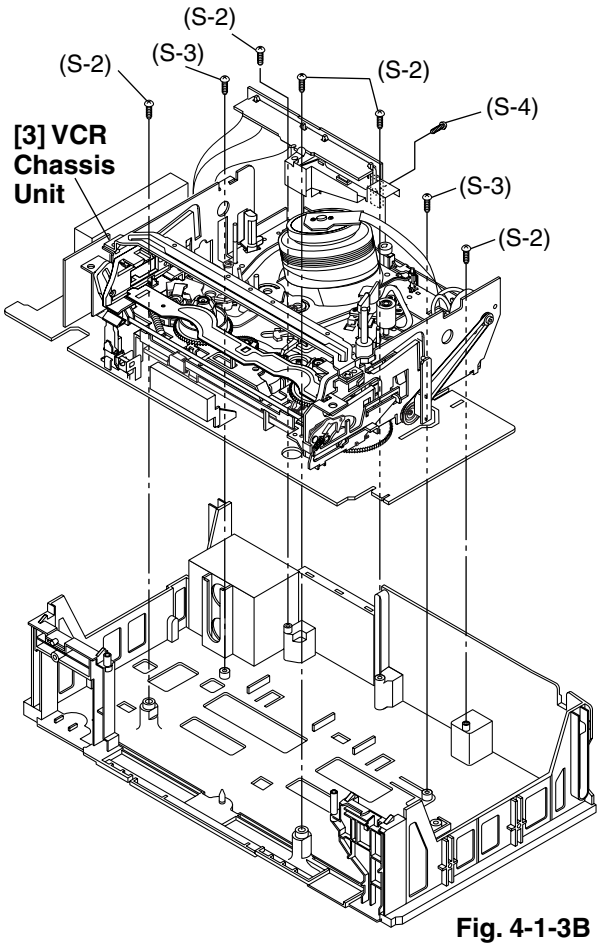


Fig. 4-1-3B

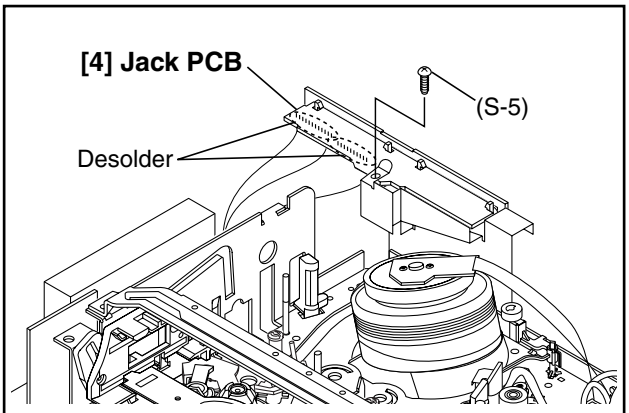
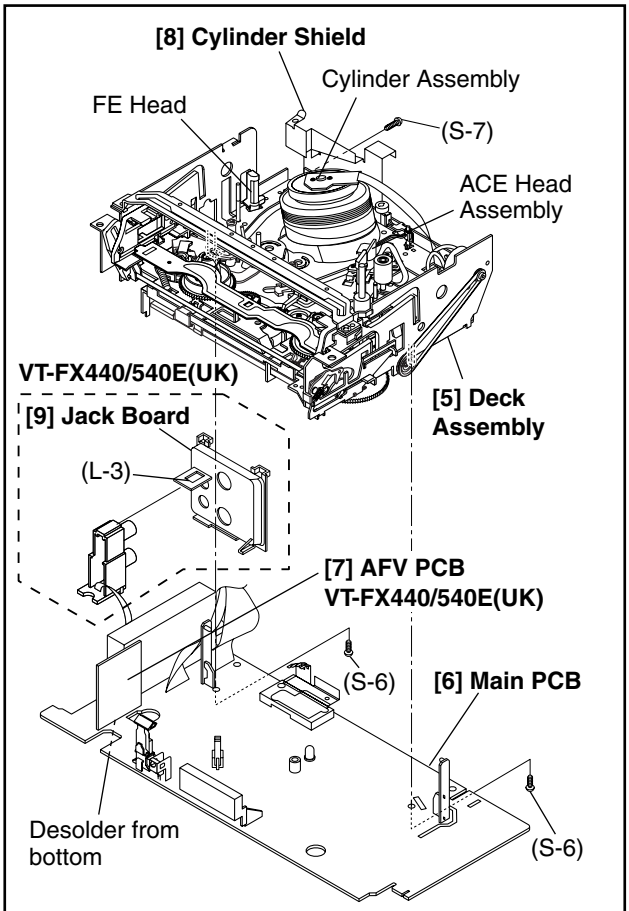
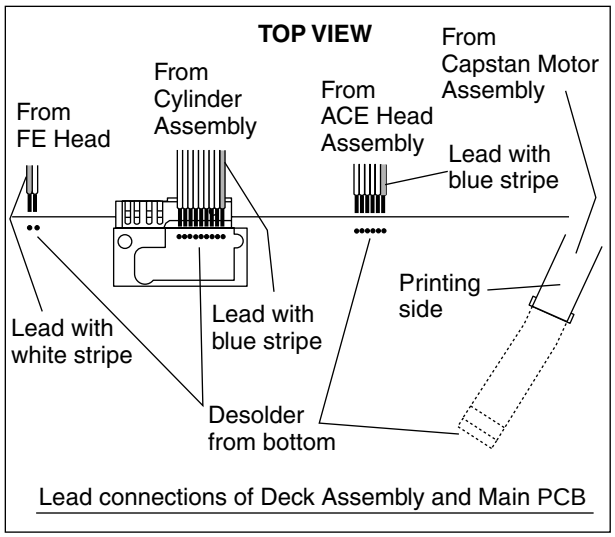


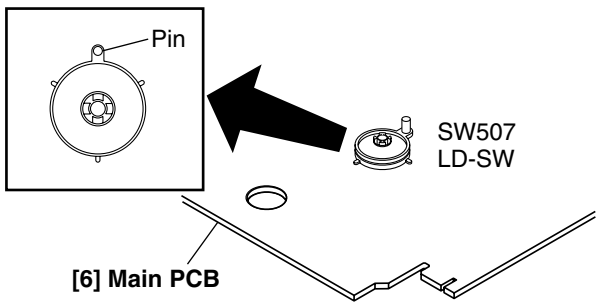
Fig. 4-1-4





Lead connections of Deck Assembly and Main PCB

Fig. 4-1-5



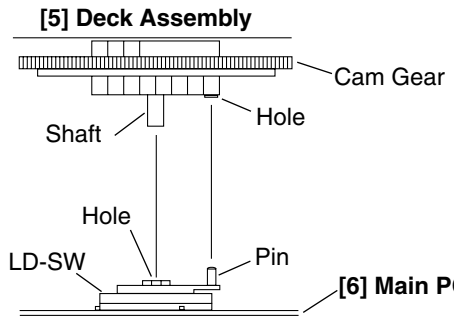


Fig. 4-1-6

4-2 DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM

Before following the procedures described below, be sure to remove the deck assembly from the cabinet. (Refer to CABINET DISASSEMBLY INSTRUCTIONS on page 4-1.)
All the following procedures, including those for adjustment and replacement of parts, should be done in Eject mode; see the positions of [44] and [45] in Fig. DM1H on page 4-6. When reassembling, follow the steps in reverse order.

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Guide Holder A	T	DM3H	2(S-1)	
[2]	[1]	Cassette Holder Assembly	T	DM4H		
[3]	[2]	Slider (SP)	T	DM5H	(S-1A), *(L-1)	
[4]	[2]	Slider (TU)	T	DM5H	*(L-2)	
[5]	[4]	Lock Lever	T	DM5H	*(L-3), *(P-1)	
[6]	[2]	Cassette Plate	T	DM5H		
[7]	[7]	Cylinder Assembly	T	DM1H, DM6H	Desolder, 3(S-2)	
[8]	[8]	Loading Motor Assembly	T	DM1H, DM7H	Desolder, LDG Belt, 2(S-3)	
[9]	[9]	ACE Head Assembly	T	DM1H, DM7H	(S-4)	
[10]	[2]	Tape Guide Arm Assembly	T	DM1H, DM8H-1	*(P-2)	
[11]	[10]	C Door Opener	T	DM1H, DM8H-1	(S-4A), *(L-4)	
[12]	[11]	Pinch Arm (B)	T	DM1H, DM8H-1, DM8H-2	*(P-3)	
[13]	[12]	Pinch Arm (A) Assembly	T	DM1H, DM8H-1, DM8H-2		
[14]	[14]	FE Head	T	DM1H, DM9H	(S-5)	
[15]	[15]	Prism	T	DM1H, DM9H	(S-6)	
[16]	[2]	Slider Shaft	T	DM10H	*(L-5)	
[17]	[16]	C Drive Lever (SP)	T	DM10H		
[18]	[16]	C Drive Lever (TU)	T	DM10H	(S-7), *(P-4)	
[19]	[19]	Capstan Motor	B	DM2H, DM11H	3(S-8), Cap Belt	
[20]	[20]	Clutch Assembly (HI)	B	DM2H, DM12H	(C-1)	
[21]	[20]	Center Gear	B	DM12H		
*[22]	[22]	F Brake Assembly (HI)	B	DM2H, DM12H	*(L-6)	
[23]	[22]	Worm Holder	B	DM2H, DM13H-1	(S-9), *(L-7), *(L-8)	
[24]	[22]	Pulley Assembly (HI)	B	DM2H, DM13H-1		
[25]	[25]	Mode Gear (LM)	B	DM2H, DM13H-1	(C-2)	
[26]	[20],[25]	Mode Lever (HI)	B	DM2H, DM13H-1, DM13H-2	(C-3)	
[27]	[22],[23], [26]	Cam Gear (A) (HI)	B	DM2H, DM13H-1, DM13H-2	(C-4)	(+)Refer to Alignment Sec. Page 4-13
[28]	[26]	TR Gear C	B	DM2H, DM13H-1	(C-5)	
[29]	[28]	TR Gear Spring	B	DM13H-1		
[30]	[29]	TR Gear A/B	B	DM13H-1		
[31]	[31]	FF Arm (HI)	B	DM1H, DM14H		
[32]	[26]	Idler Assembly (HI)	B	DM1H, DM14H	*(L-9)	

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[33]	[26]	BT Arm	B	DM2H, DM14H	*(P-5)	
[34]	[26]	Loading Arm (SP) Assembly	B	DM2H, DM14H		(+)Refer to Alignment Sec. Page 4-13
[35]	[34]	Loading Arm (TU) Assembly	B	DM2H, DM14H		(+)Refer to Alignment Sec. Page 4-13
[36]	[16],[26]	M Brake (TU) Assembly (HI)	T	DM1H, DM15H		
[37]	[2],[26]	M Brake (SP) Assembly (HI)	T	DM1H, DM15H	*(P-6)	
[38]	[37]	Tension Lever Assembly	T	DM1H, DM15H		
[39]	[38]	T Lever Holder	T	DM15H	*(L-10)	
[40]	[40]	M Gear (HI)	T	DM1H, DM15H	(C-6)	
[41]	[15],[40]	Sensor Gear (HI)	T	DM1H, DM15H	(C-7)	
[42]	[36],[40]	Reel T	T	DM1H, DM15H		
[43]	[38]	Reel S	T	DM1H, DM15H		
[44]	[34],[38]	Moving Guide S Preparation	T	DM1H, DM16H	(S-11), Slide Plate	
[45]	[35]	Moving Guide T Preparation	T	DM1H, DM16H		
[46]	[19]	TG Post Assembly	T	DM1H, DM16H	*(L-11)	
[47]	[27]	Rack Assembly	R	DM17H		(+)Refer to Alignment Sec. Page 4-13
[48]	[47]	F Door Opener	R	DM17H		
[49]	[49]	Cleaner Assembly	T	DM1H, DM6H		
[50]	[49]	CL Post	T	DM6H	*(L-12)	
↓ (1)	↓ (2)	↓ (3)	↓ (4)	↓ (5)	↓ (6)	↓ (7)

(1): Follow steps in sequence. When reassembling, follow the steps in reverse order.
These numbers are also used as identification (location) No. of parts in the figures.

(2): Indicates the part to start disassembling with in order to disassemble the part in column (1).

(3): Name of the part

(4): Location of the part: T=Top B=Bottom R=Right L=Left

(5): Figure Number

(6): Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder
e.g., 2(L-2) = two Locking Tabs (L-2).

(7): Adjustment Information for Installation
(+):Refer to Deck Exploded Views for lubrication.

*** F Brake Assembly (HI) ([22]) is used in VT-FX440/540E(UK) only.**

Top View

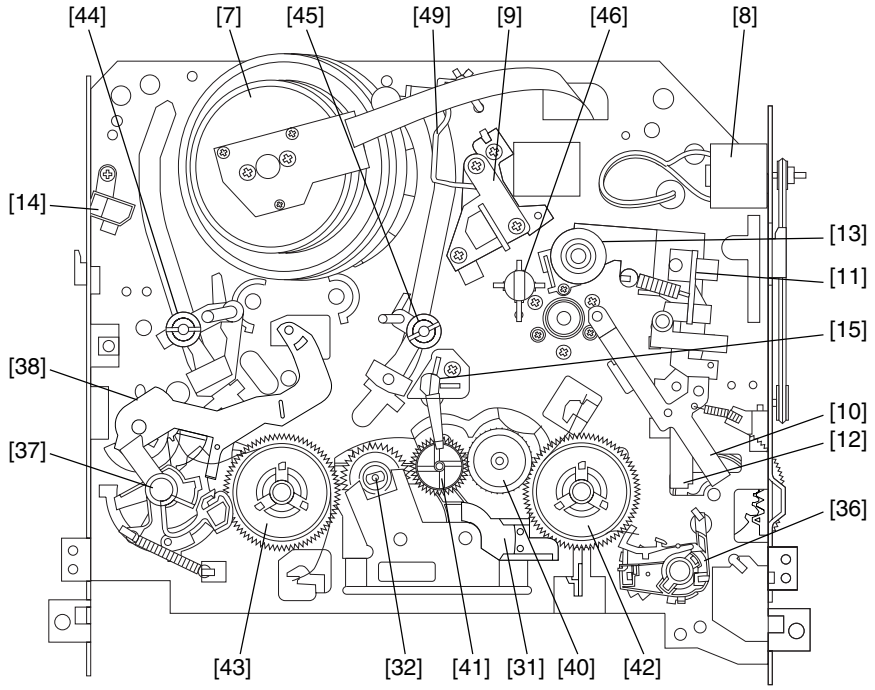


Fig. DM1H

Bottom View

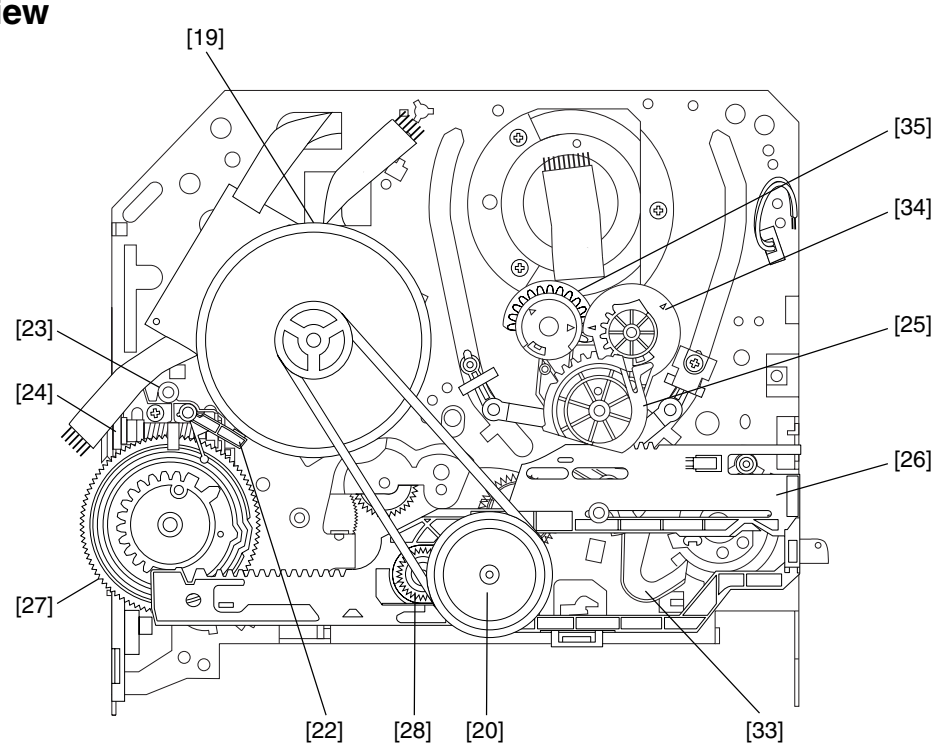


Fig. DM2H

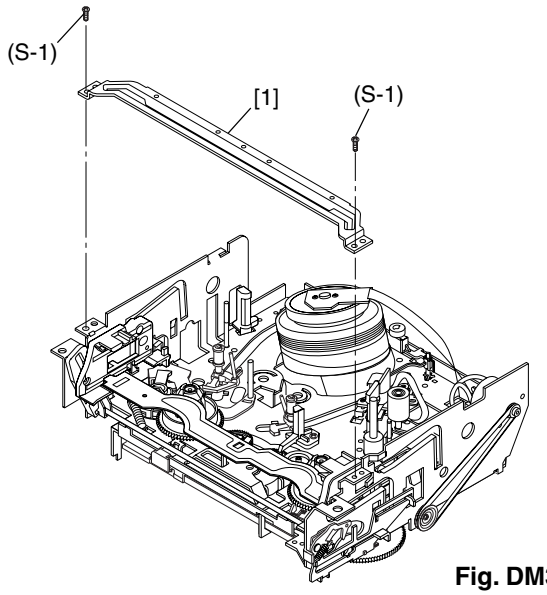
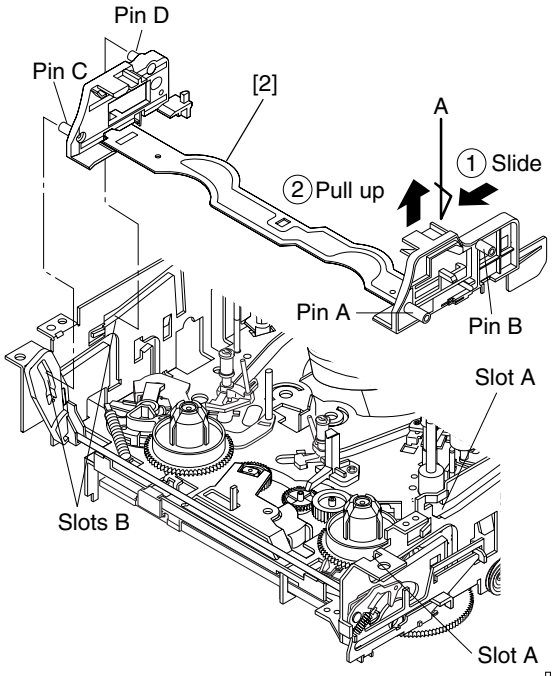


Fig. DM3H



First, while pushing the locking tab as shown in the right, slide and pull up the right side on [2] to release Pin A and Pin B from the slots A.
Then, remove Pin C and Pin D on [2] from the slots B as shown.

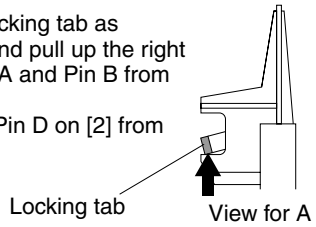
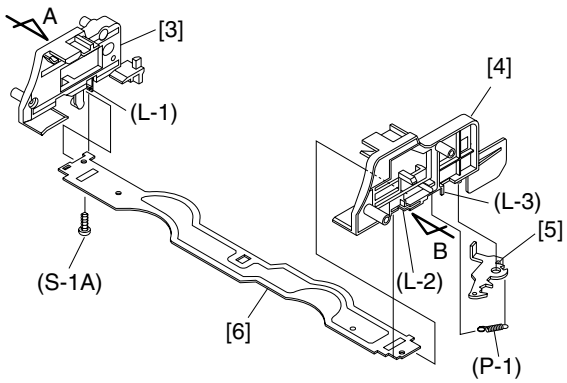
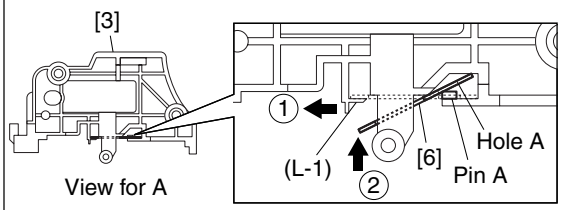


Fig. DM4H



Installation of [3] and [6]

First, insert [6] diagonally in [3] as shown below. Then, install [6] in [3] while pushing (L-1) in a direction of arrow. After installing [6] in [3], confirm that pin A of [3] enters hole A of [6] properly.



Installation of [4] and [6]

Install [6] in [4] while pulling (L-2) in a direction of arrow. After installing [6] in [4], confirm that pin B of [4] enters hole B of [6] properly.

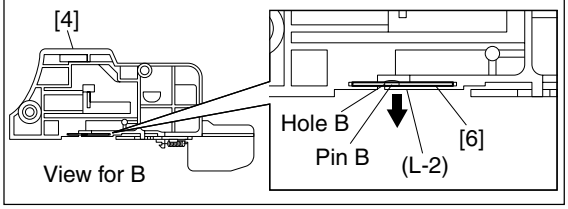


Fig. DM5H

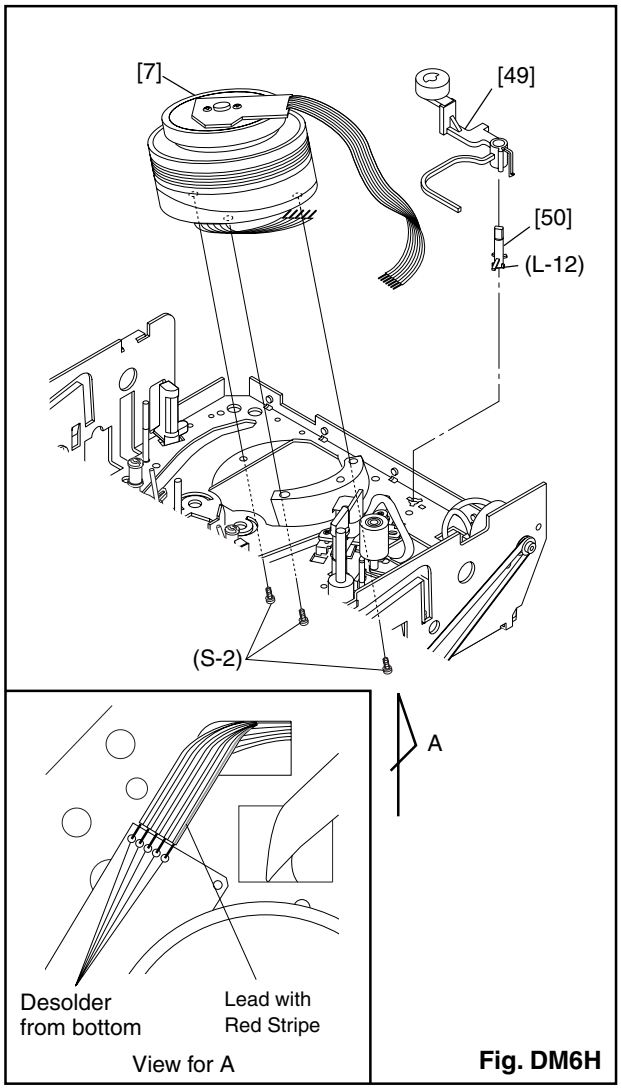


Fig. DM6H

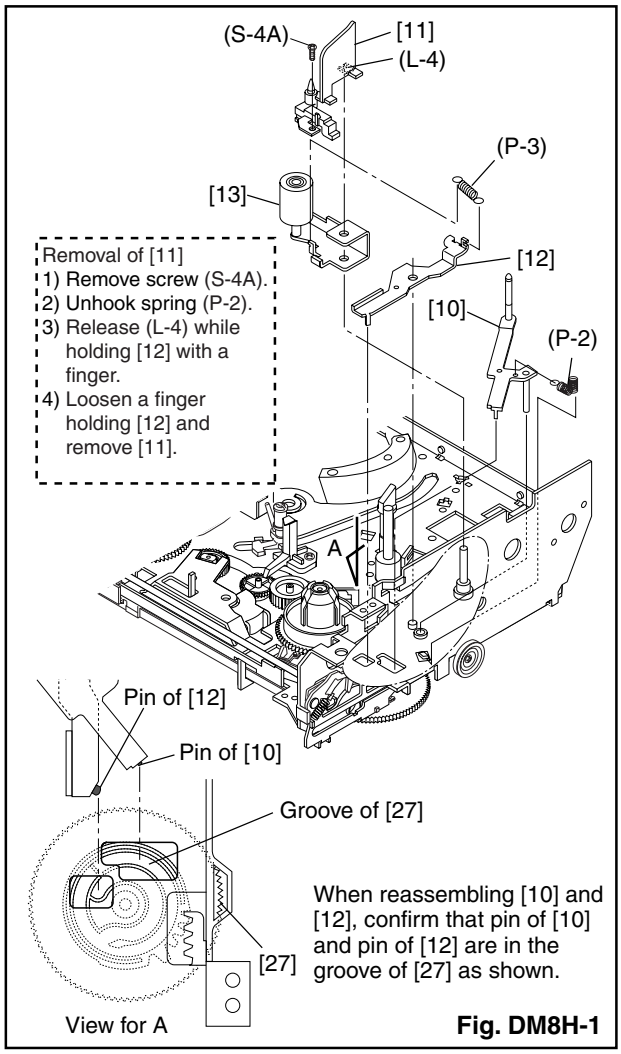


Fig. DM8H-1

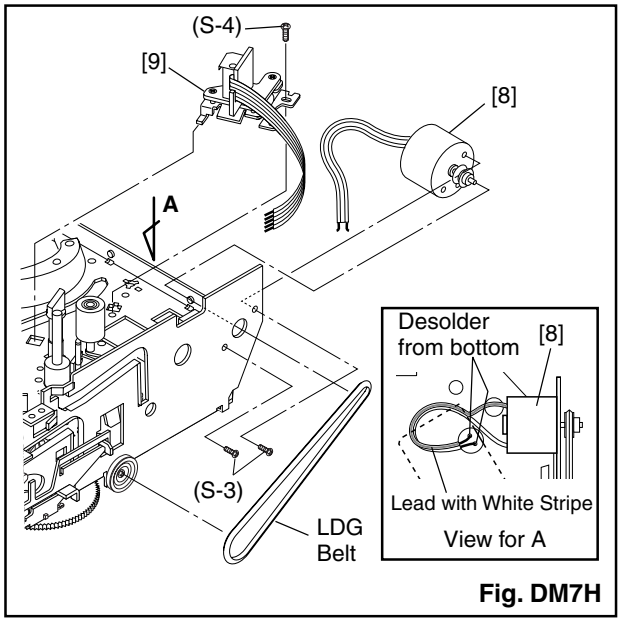


Fig. DM7H

Installation of [13] and [12]

Hook spring (P-3) up to [12] and [13], then install then to the specified position so that [12] will be floated slightly while holding [12] and [13]. (Refer to Fig. A.)

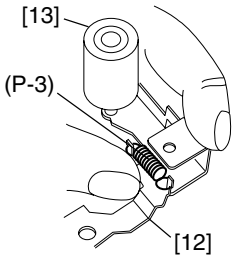


Fig. A

Install pin of [12] in groove of [27]. (Refer to Fig. B.)

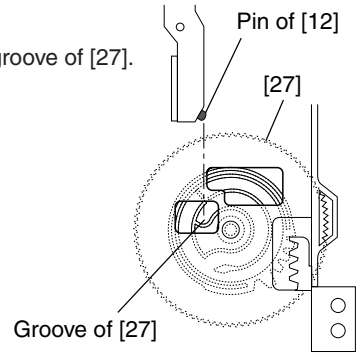


Fig. B (Top view)

Hold [12] and [13] till groove of pin of chassis looks and fit [13] in notch of chassis. Then, turn a few [13] while holding [12]. (Refer to Fig. C.)

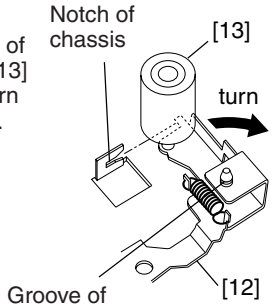


Fig. C

Install [11] and [10] while holding [12]. (Refer to Fig. DM8H-1.)

Fig. DM8H-2

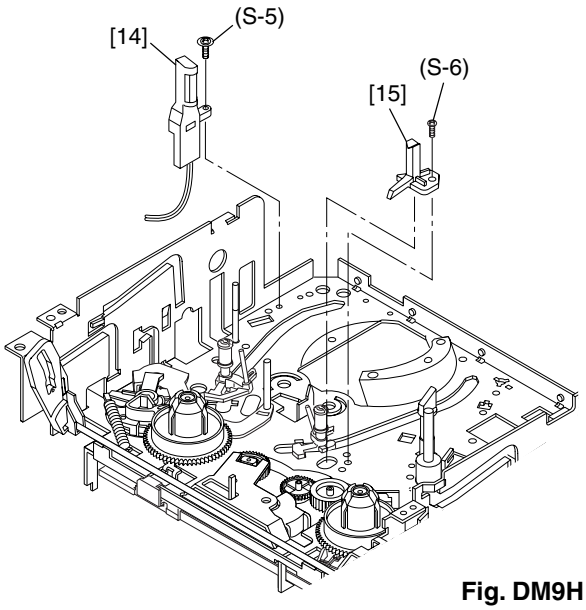


Fig. DM9H

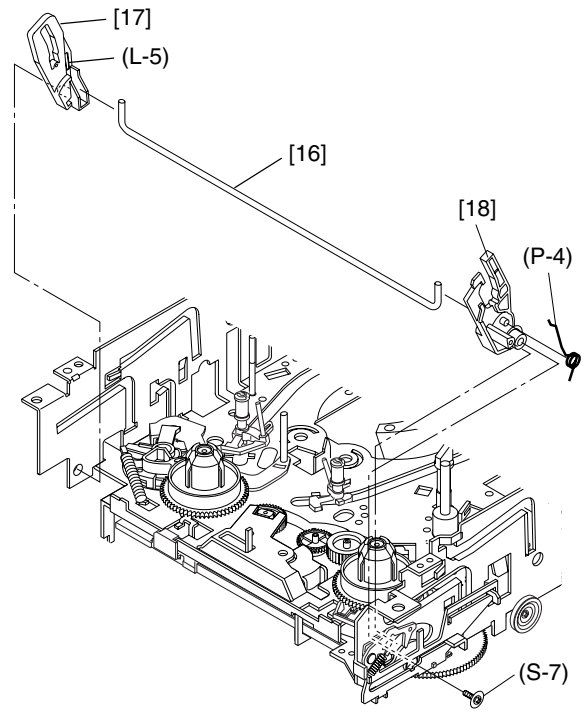
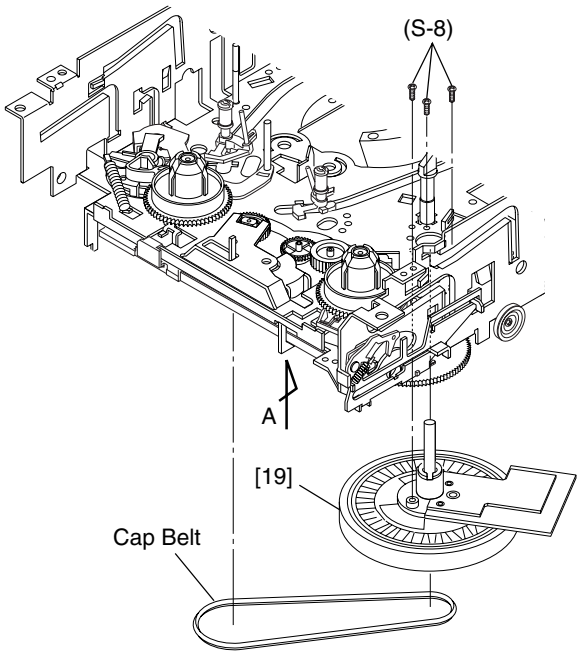
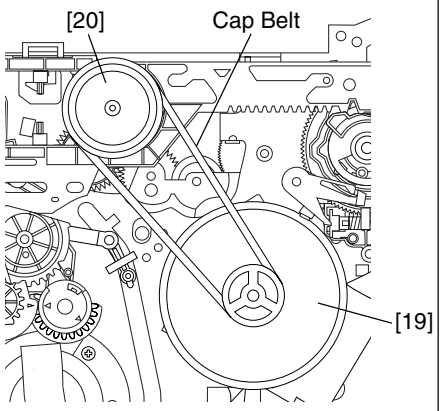


Fig. DM10H

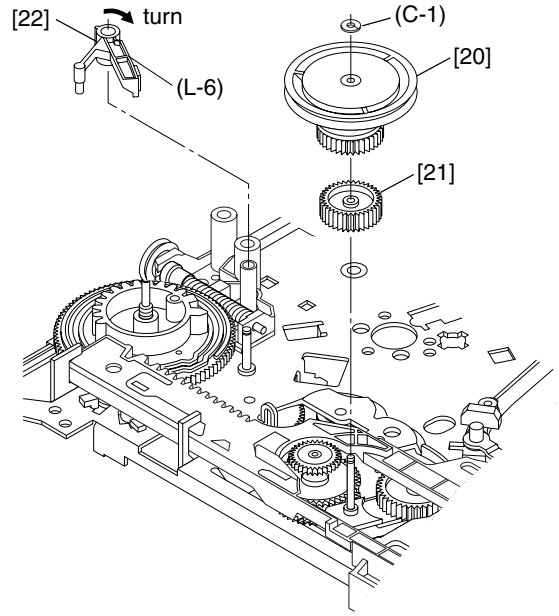


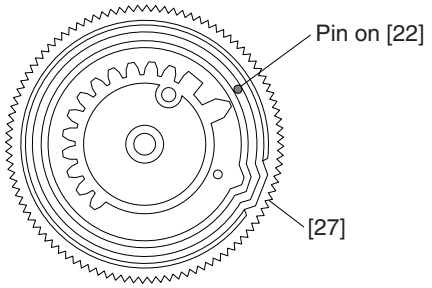
Installation position of Cap Belt



View for A

Fig. DM11H





Position of pin on [22]

Fig. DM12H

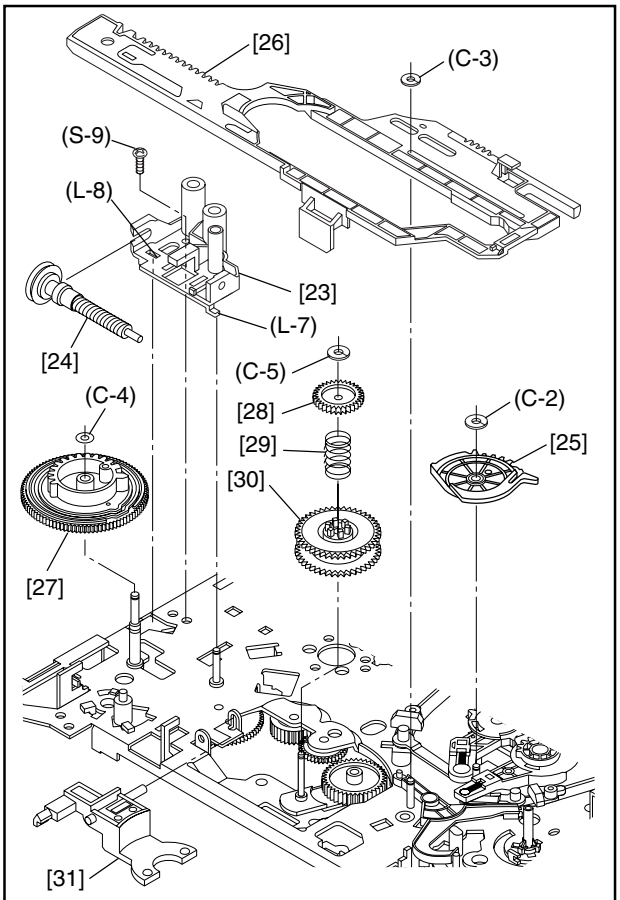
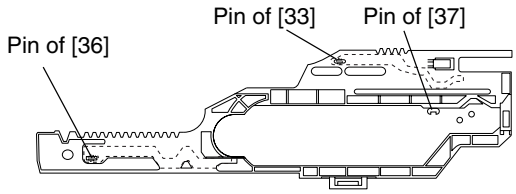
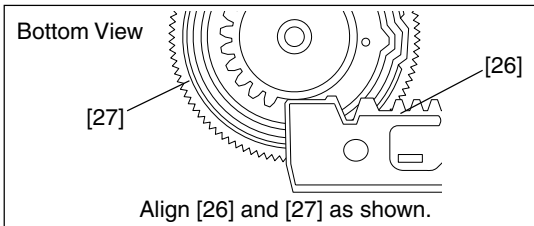


Fig. DM13H-1

Installation of [26]

Position of Mode Lever when installed





Align [26] and [27] as shown.

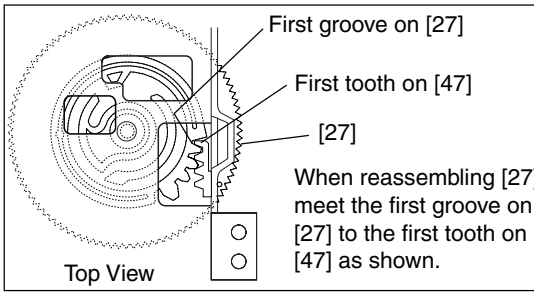

First groove on [27]
First tooth on [47]
[27]
When reassembling [27], meet the first groove on [27] to the first tooth on [47] as shown.
Top View

Fig. DM13H-2

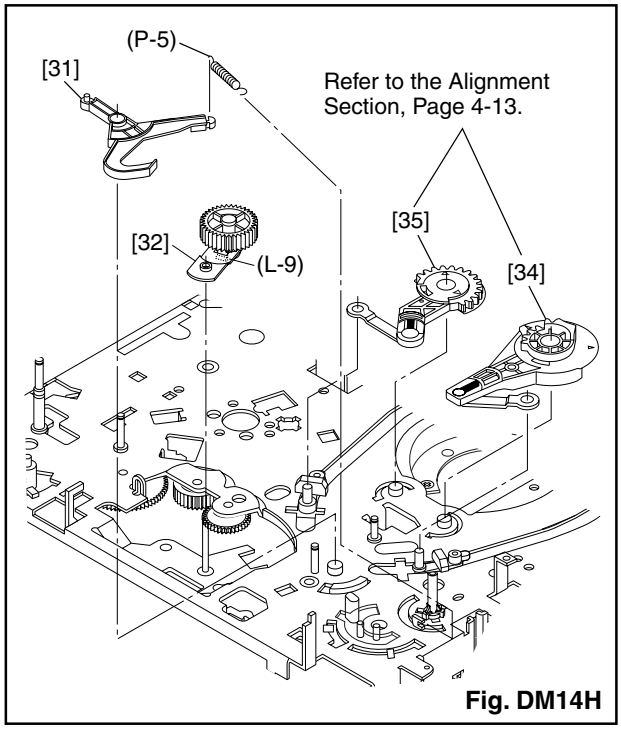


Fig. DM14H

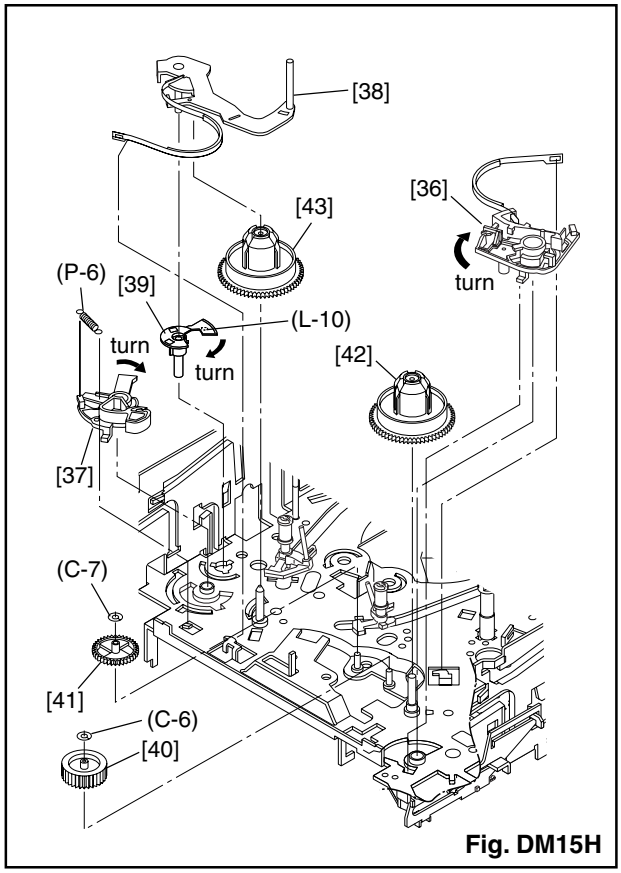


Fig. DM15H

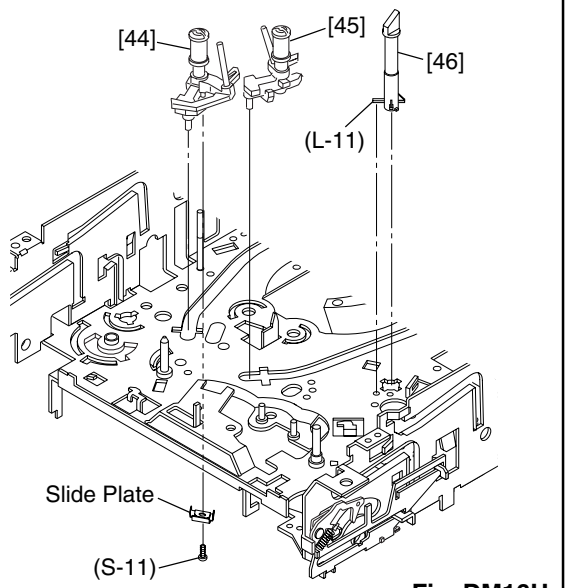


Fig. DM16H

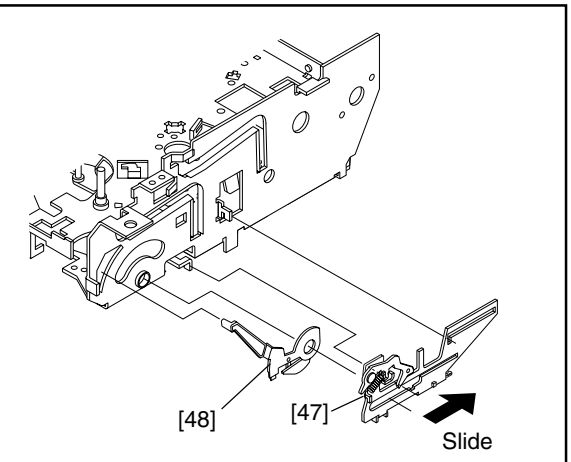


Fig. DM17H

4-3 ALIGNMENT PROCEDURES OF MECHANISM

The following procedures describe how to align the individual gears and levers that make up the tape loading/unloading mechanism. Since information about the state of the mechanism is provided to the System Control Circuit only through the Mode Switch, it is essential that the correct relationship between individual gears and levers be maintained.

All alignments are to be performed with the mechanism in Eject mode, in the sequence given. Each procedure assumes that all previous procedures have been completed.

IMPORTANT:

If any one of these alignments is not performed properly, even if off by only one tooth, the unit will unload or stop and it may result in damage to the mechanical or electrical parts.

Alignment points in Eject Position

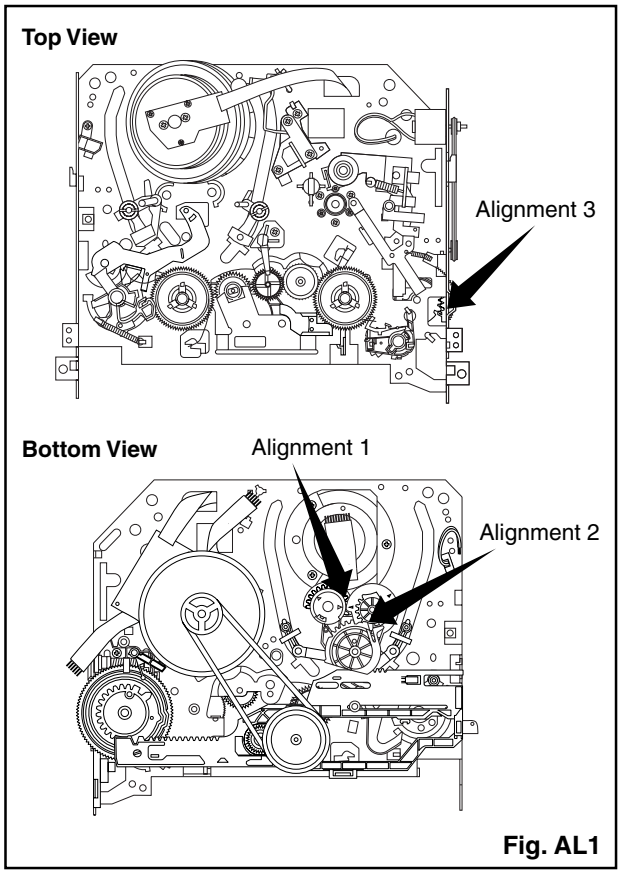


Fig. AL1

Alignment 1

Loading Arm (SP) and (TU) Assembly

Install Loading Arm (SP) and (TU) Assembly so that their triangle marks point to each other as shown in Fig. AL2.

Alignment 2

Mode Gear

Keeping the two triangles pointing at each other, install the Loading Arm (SP) Assembly so that the last tooth of the gear meets the most inside teeth of the Mode Gear. See Fig. AL2.

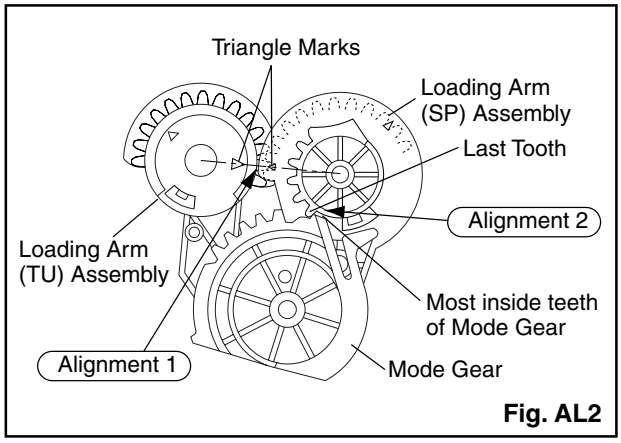


Fig. AL2

Alignment 3

Cam Gear (A) (HI), Rack Assembly

Install the Rack Assembly so that the first tooth on the gear of the Rack Assembly meets the first groove on the Cam Gear (A) (HI) as shown in Fig. AL3.

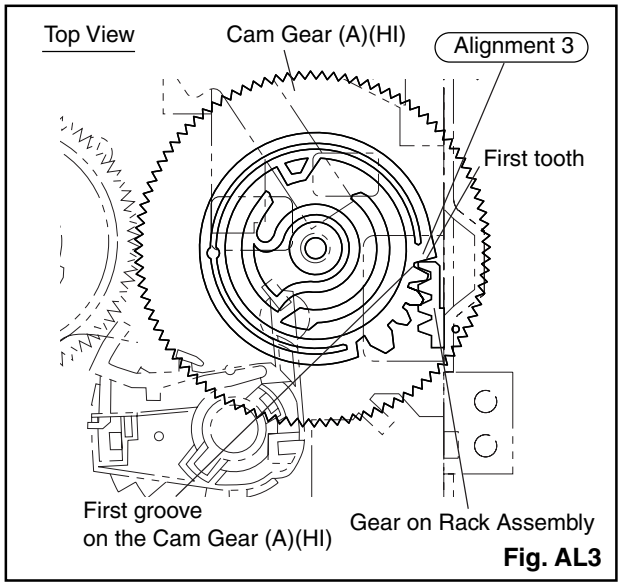


Fig. AL3

5 ADJUSTMENT

5-1 PREPARATION FOR SERVICING

5-1-1 How to Enter the Service Mode

About Optical Sensors

Caution:

An optical sensor system is used for the Tape Start and End Sensors on this equipment. Carefully read and follow the instructions below. Otherwise the unit may operate erratically.

What to do for preparation

Insert a tape into the Deck Mechanism Assembly and press the PLAY button. The tape will be loaded into the Deck Mechanism Assembly. Make sure the power is on, connect TP507 (SENSOR INHIBITION) to GND. This will stop the function of Tape Start Sensor, Tape End Sensor and Reel Sensors. (If these TPs are connected before plugging in the unit, the function of the sensors will stay valid.) See Fig. 5-1-1.

Note: Because the Tape End Sensors are inactive, do not run a tape all the way to the start or the end of the tape to avoid tape damage.

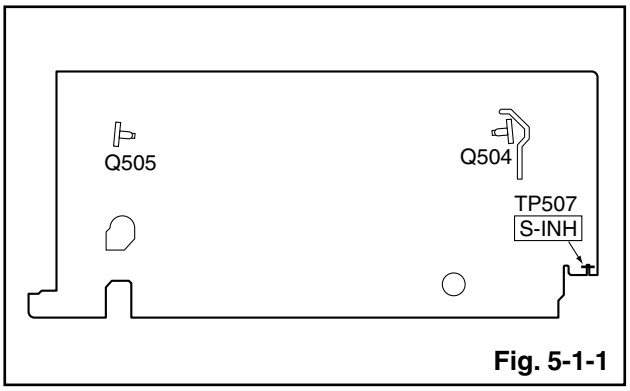
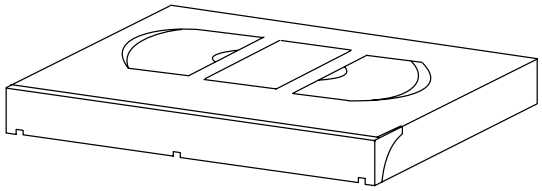


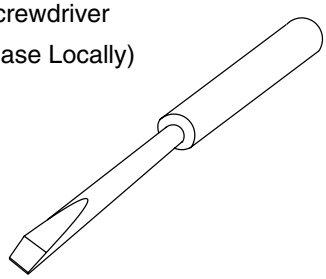
Fig. 5-1-1

5-2 FIXTURE AND TAPE FOR ADJUSTMENT

1. Alignment Tape (MH-2)
   No. 7099052



3. Flat Screwdriver
   (Purchase Locally)



2. Guide Roller Adj. Screwdriver
   No. 7099028

5-2-1 How To Use The Fixtures And Tape

Item No.	Name	Part No.	Adjustment
1	Alignment Tape (MH-2)	7099052	● Head Switching Position ● Tape Interchangeability Alignment
2	Guide Roller Adj. Screwdriver	7099028	● Guide Roller
3	Flat Screwdriver	Purchase Locally	● X Value Alignment

5-3 ELECTRICAL ADJUSTMENT INSTRUCTIONS

General Note: "PCB" is an abbreviation for "Circuit Board Assembly."

NOTE:

1. Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to do these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.
2. To perform these alignment / confirmation procedures, make sure that the tracking control is set in the center position: Press either "CHANNEL ▼" or "CHANNEL ▲" button on the front panel first, then the "PLAY" button on the front panel.

5-3-1 Test Equipment Required

1. Oscilloscope: Dual-trace with 10:1 probe,
   V-Range: 0.001~50V/Div.,
   F-Range: DC~AC-20MHz
2. Alignment Tape (MH-2)

5-3-2 Head Switching Position Adjustment

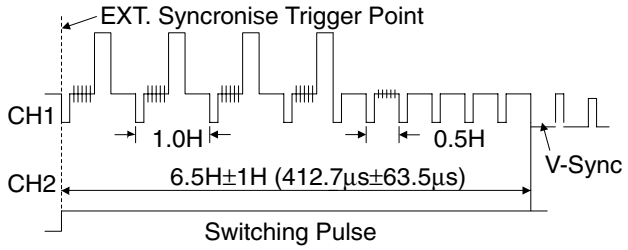
Purpose:

To determine the Head Switching position during playback.

Symptom of Misadjustment:

May cause Head Switching noise or vertical jitter in the picture.

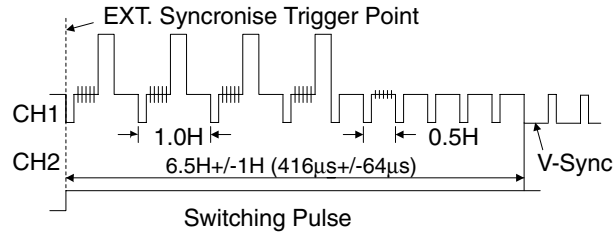
VT-FX440E(UK) / VT-MX410E(UK)



Reference Notes:

Playback the Alignment tape and adjust VR501 so that the V-sync front edge of the CH1 video output waveform is at the 6.5H±1H(412.7µs±63.5µs) delayed position from the rising edge of the CH2 head switching pulse waveform.

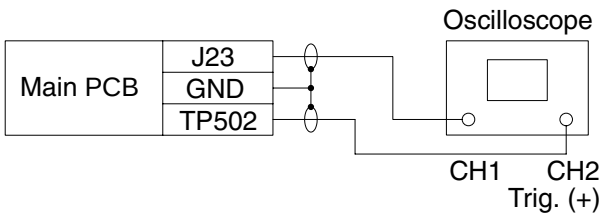
VT-FX540E(UK)



Playback the Alignment tape and adjust VR501 so that the V-sync front edge of the CH1 video output waveform is at the 6.5H±1H(416µs±64µs) delayed position from the rising edge of the CH2 head switching pulse waveform.

Test point	Adj.Point	Mode	Input	Mode	Input
J23(V-OUT) TP502(RF-SW) GND	VR501 (Switching Point) (MAIN PCB)	PLAY (SP)	-----	PLAY (SP)	-----
Tape	**Measurement Equipment**	**Spec VT-FX440/MX410**		**Spec VT-FX540**	
MH-2	Oscilloscope	6.5H±1H (412.7µs±63.5µs)		6.5H±1H (416µs±64µs)	

Connection of Measurement Equipment



5-4 MECHANICAL ALIGNMENT PROCEDURES

Explanation of alignment for the tape to correctly run starts on the next page. Refer to the information below on this page if a tape gets stuck, for example, in the mechanism due to some electrical trouble of the unit.

5-4-1 Service Information

A. Method for Manual Tape Loading/Unloading

To load a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Case and Front Assembly.
3. Insert a cassette tape. Though the tape will not be automatically loaded, make sure that the cassette tape is all the way in at the inlet of the Cassette Holder. To confirm this, lightly push the cassette tape further in and see if the tape comes back out, by a spring motion, just as much as you have pushed in.
4. Turn the LDG Belt in the appropriate direction shown in Fig. 5-4-1 for a minute or two to complete this task.

To unload a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Case and Front Assembly.
3. Make sure that the Moving guide preparations are in the Eject Position.
4. Turn the LDG Belt in the appropriate direction shown in Fig. 5-4-1 until the Moving guide preparations come to the Eject Position. Stop turning when the preparations begin clicking or can not be moved further. However, the tape will be left wound around the cylinder.
5. Turn the LDG Belt in the appropriate direction continuously, and the cassette tape will be ejected. Allow a minute or two to complete this task.

B. Method to place the Cassette Holder in the tape-loaded position without a cassette tape

1. Disconnect the AC Plug.
2. Remove the Top Case and Front Assembly.
3. Turn the LDG Belt in the appropriate direction shown in Fig. 5-4-1. Release the locking tabs shown in Fig. 5-4-1 and continue turning the LDG Belt until the Cassette Holder comes to the tape-loaded position. Allow a minute or two to complete this task.

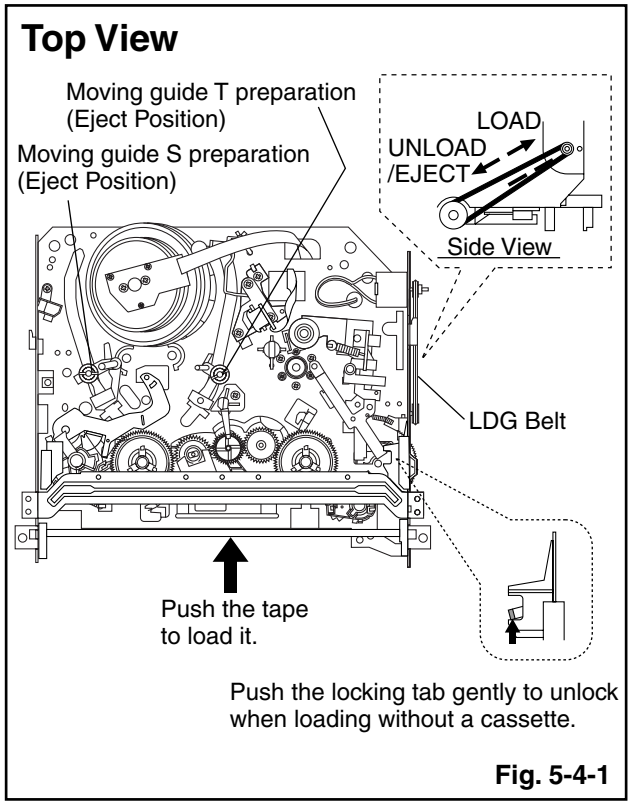


Fig. 5-4-1

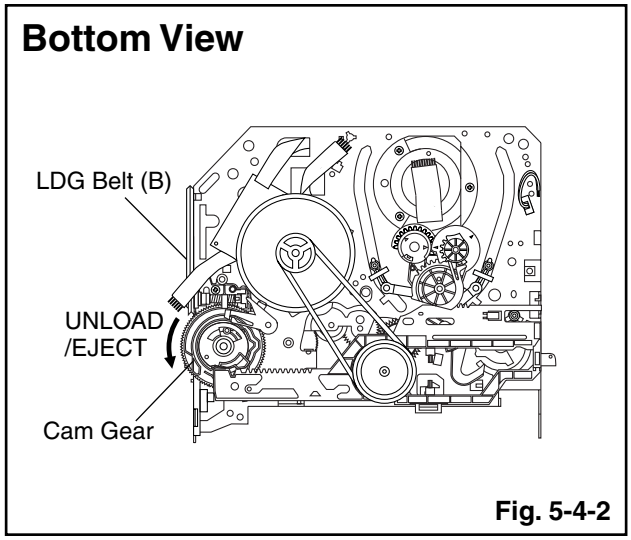


Fig. 5-4-2

5-4-2 Tape Interchangeability Alignment

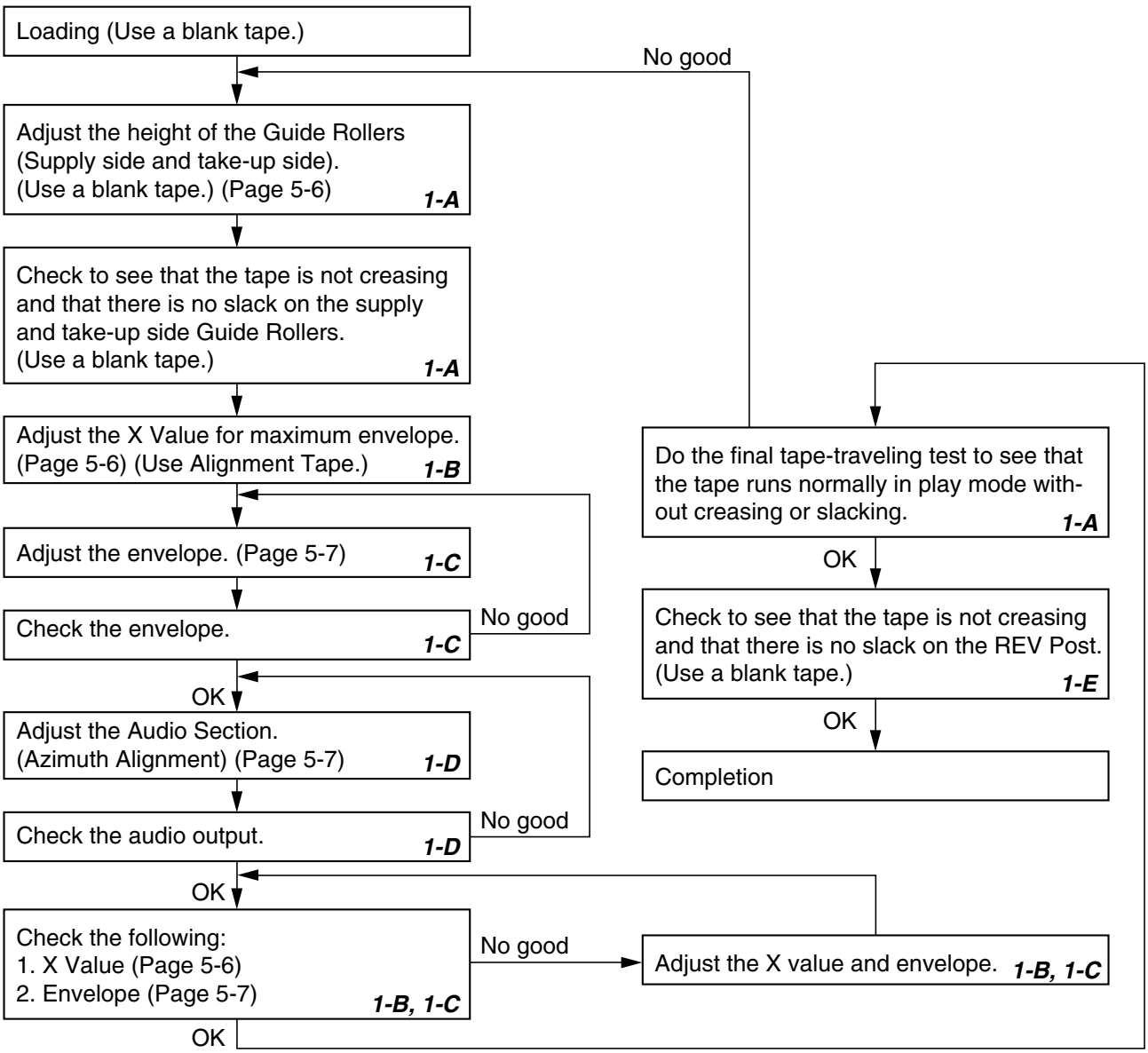
Note:
To do these alignment procedures, make sure that the Tracking Control Circuit is set to the center position every time a tape is loaded or unloaded. (Refer to page 5-7, procedure 1-C, step 2.)

Equipment required:

Dual Trace Oscilloscope
VHS Alignment Tape (MH-2)
Guide Roller Adj. Screwdriver
Flat Screwdriver (Purchase Locally)

Note: Before starting this Mechanical Alignment, do all Electrical Adjustment procedures.

Flowchart of Alignment for tape traveling


Loading (Use a blank tape.)
No good
Adjust the height of the Guide Rollers (Supply side and take-up side). (Use a blank tape.) (Page 5-6) 1-A
Check to see that the tape is not creasing and that there is no slack on the supply and take-up side Guide Rollers. (Use a blank tape.) 1-A
Adjust the X Value for maximum envelope. (Page 5-6) (Use Alignment Tape.) 1-B
Adjust the envelope. (Page 5-7) 1-C
Check the envelope. 1-C
No good
OK
Adjust the Audio Section. (Azimuth Alignment) (Page 5-7) 1-D
Check the audio output. 1-D
No good
OK
Check the following:
1. X Value (Page 5-6)
2. Envelope (Page 5-7) 1-B, 1-C
No good
Adjust the X value and envelope. 1-B, 1-C
OK
Do the final tape-traveling test to see that the tape runs normally in play mode without creasing or slacking. 1-A
OK
Check to see that the tape is not creasing and that there is no slack on the REV Post. (Use a blank tape.) 1-E
OK
Completion

1-A. Preliminary/Final Checking and Alignment of Tape Path

Purpose:

To make sure that the tape path is well stabilized.

Symptom of Misalignment:

If the tape path is unstable, the tape will be damaged.

Note: Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

1. Playback a blank cassette tape and check to see that the tape runs without creasing at Guide Rollers [2] and [3], and at points A and B on the lead surface. (Refer to Fig. 5-4-3 and 5-4-4.)
2. If creasing is apparent, align the height of the guide rollers by turning the top of Guide Rollers [2] and [3] with a Guide Roller Adj. Screwdriver. (Refer to Fig. 5-4-3 and 5-4-5.)

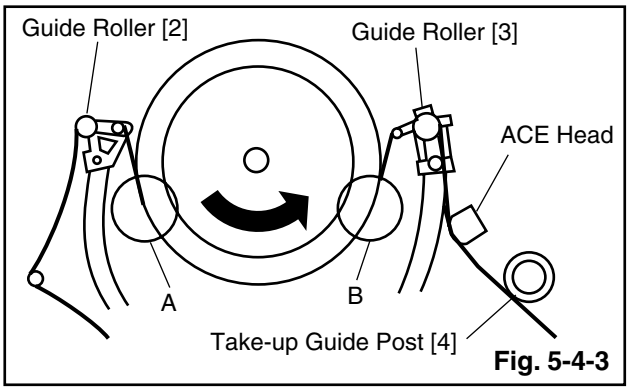


Fig. 5-4-3

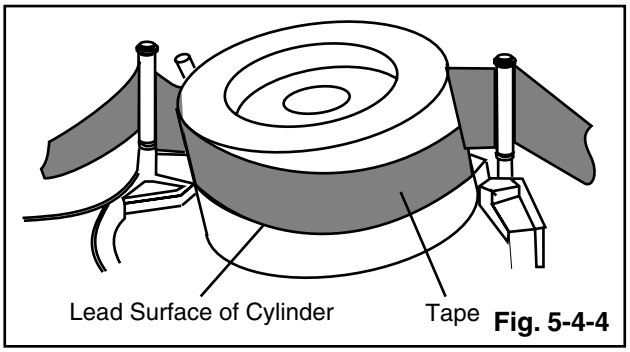


Fig. 5-4-4

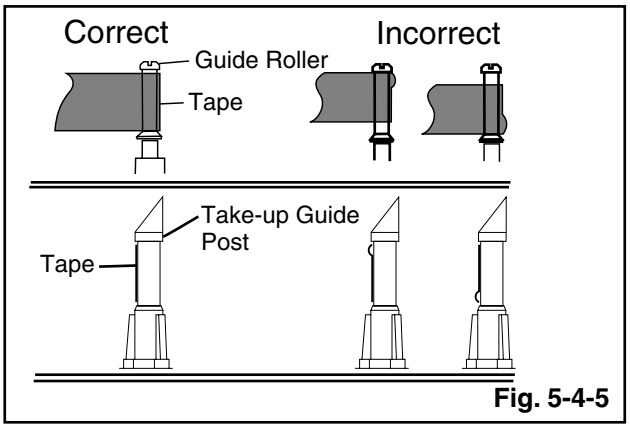


Fig. 5-4-5

3. Check to see that the tape runs without creasing at Take-up Guide Post [4] or without snaking between Guide Roller [3] and ACE Head. (Fig. 5-4-3 and 5-4-5)
4. If creasing or snaking is apparent, adjust the Tilt Adj. Screw of the ACE Head. (Fig. 5-4-6)

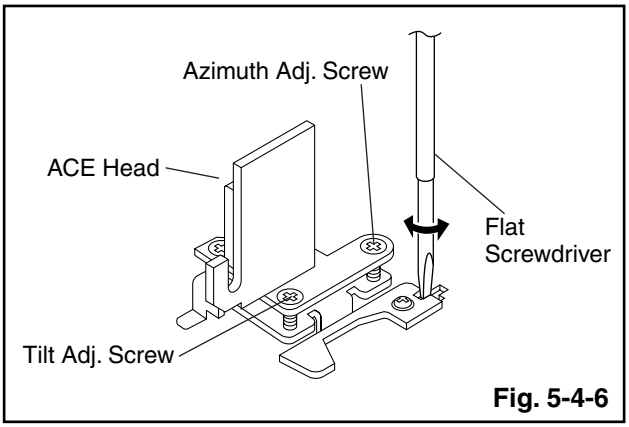


Fig. 5-4-6

1-B. X Value Alignment

Purpose:

To obtain maximum PB FM envelope signal at the preset position of the Tracking Control Circuit, align the Horizontal Position of the ACE Head.

Symptom of Misalignment:

If the Horizontal Position of the ACE Head is not properly aligned, maximum PB FM envelope cannot be obtained at the preset position of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) and TP501 (CTL) on the Main PCB. Use TP502 (RF-SW) as a trigger.
2. Playback the Gray Scale of the Alignment Tape (MH-2) and confirm that the PB FM signal is present.
3. Set the Tracking Control Circuit to the preset position by pressing CH UP button on the remote control unit then “PLAY” button on the unit. (Refer to note on bottom of page 5-7.)
4. Use the Flat Screwdriver so that the PB FM signal at TP301 (C-PB) is maximum. (Fig. 5-4-6)

5. To shift the CTL waveform, press CH UP or CH DOWN button on the remote control unit. Then make sure that the maximum output position of PB FM envelope signal become within ±2ms from preset position.

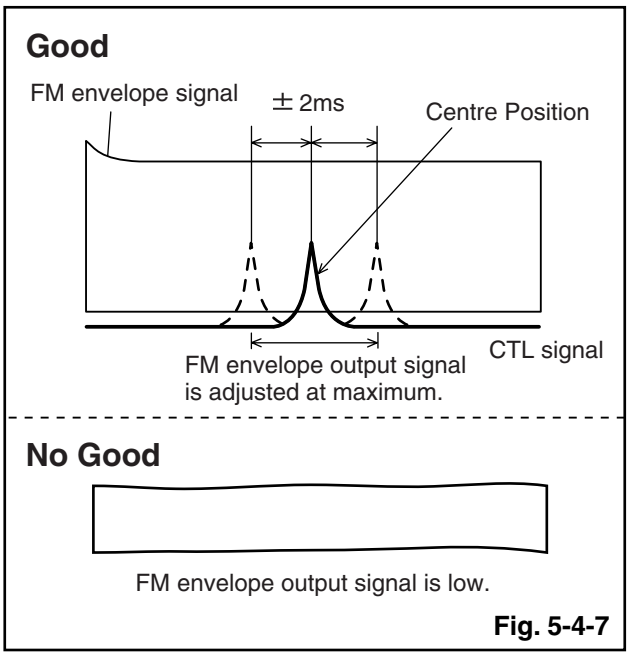


Fig. 5-4-7

6. Set the Tracking Control Circuit to the preset position by pressing CH UP button on the remote control unit. and then “PLAY” button.

1-C. Checking/Adjustment of Envelope Waveform

Purpose:

To achieve a satisfactory picture, adjust the PB FM envelope becomes as flat as possible.

Symptom of Misalignment:

If the envelope output is poor, noise will appear in the picture. The tracking will then lose precision and the playback picture will be distorted by any slight variation of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) on the Main PCB. Use TP502 (RF-SW) as a trigger.
2. Playback the Gray Scale on the Alignment Tape (MH-2). Set the Tracking Control Circuit to the preset position by pressing CH UP button and then “PLAY” button on the unit. Adjust the height of Guide Rollers [2] and [3] (Fig. 5-4-3, Page 5-6) watching the oscilloscope display so that the envelope becomes as flat as possible. To do this adjustment, turn the top of the Guide Roller with the Guide Roller Adj. Screwdriver.
3. If the envelope is as shown in Fig. 5-4-7, adjust the height of Guide Roller [2] (Refer to Fig. 5-4-3) so that the waveform looks like the one shown in Fig. 5-4-9.
4. If the envelope is as shown in Fig. 5-4-8, adjust the height of Guide Roller [3] (Refer to Fig. 5-4-3) so that the waveform looks like the one shown in Fig. 5-4-9.
5. When Guide Rollers [2] and [3] (Refer to Fig. 5-4-3) are aligned properly, there is no envelope drop either at the beginning or end of track as shown in Fig. 5-4-9.

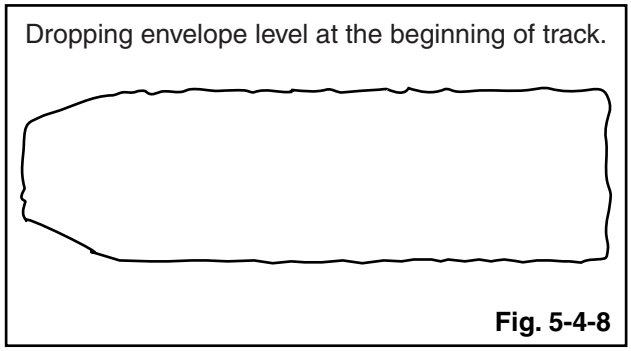


Fig. 5-4-8

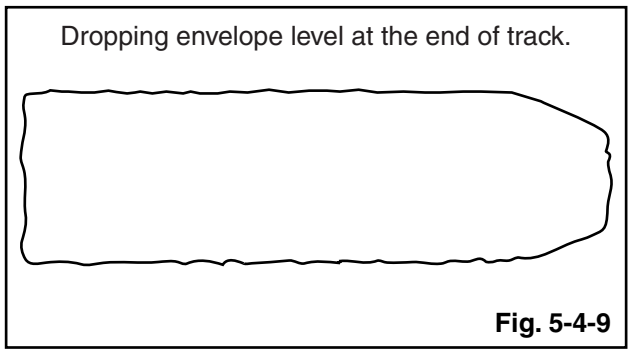


Fig. 5-4-9

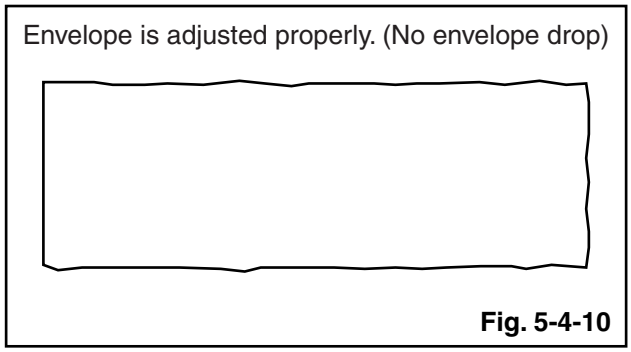


Fig. 5-4-10

Note: Upon completion of the adjustment of Guide Rollers [2] and [3] (Refer to Fig. 5-4-3), check the X Value by pushing the CH UP or DOWN buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure preset position. The number of pushes CH UP button to achieve 1/2 level of envelope should match the number of pushes CH DOWN button from center. If required, redo the “X Value Alignment.”

1-D. Azimuth Alignment of Audio/Control/ Erase Head

Purpose:

To correct the Azimuth alignment so that the Audio/ Control/Erase Head meets tape tracks properly.

Symptom of Misalignment:

If the position of the Audio/Control/Erase Head is not properly aligned, the Audio S/N Ratio or Frequency Response will be poor.

1. Connect the oscilloscope to the audio output jack on the rear side of the deck.
2. Playback the alignment tape (MH-2) and confirm that the audio signal output level is 8kHz.
3. Adjust Azimuth Adj. Screw so that the output level on the AC Voltmeter or the waveform on the oscilloscope is at maximum. (Fig. 5-4-6)

Note: Upon completion of the adjustment of Azimuth Adj. Screw, check the X Value by pushing the CH UP or DOWN buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure preset position. The number of pushes CH UP button to achieve 1/2 level of envelope should match the number of pushes CH DOWN button from center. If required, redo the “X Value Alignment.”

1-E. Checking and Alignment of Tape Path during reversing

Purpose:

To make sure that the tape path is well stabilized during reversing.

Symptom of Misalignment:

If the tape path is unstable during reversing, the tape will be damaged.

Note: Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

1. Insert a black cassette tape into the tray and set the unit to REV. Then confirm if the tape has been curled up or bent at the Take-up Guide Post [4] or REV Post [5]. (Refer to Fig. 5-4-11 and 5-4-12.)
2. When the tape has been curled up or bent, turn the alignment screw to adjust the height of REV Post. (Refer to Fig. 5-4-11 and 5-4-13.)

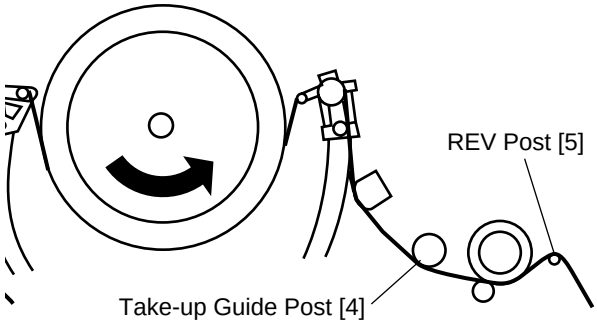


Fig. 5-4-11

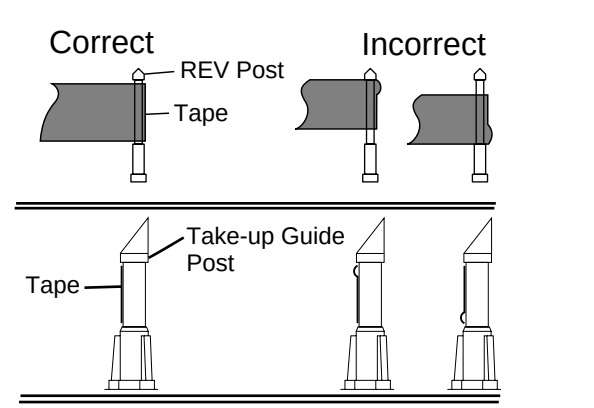


Fig. 5-4-12

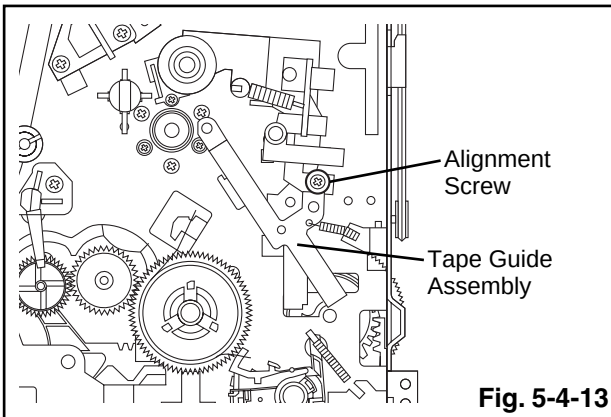


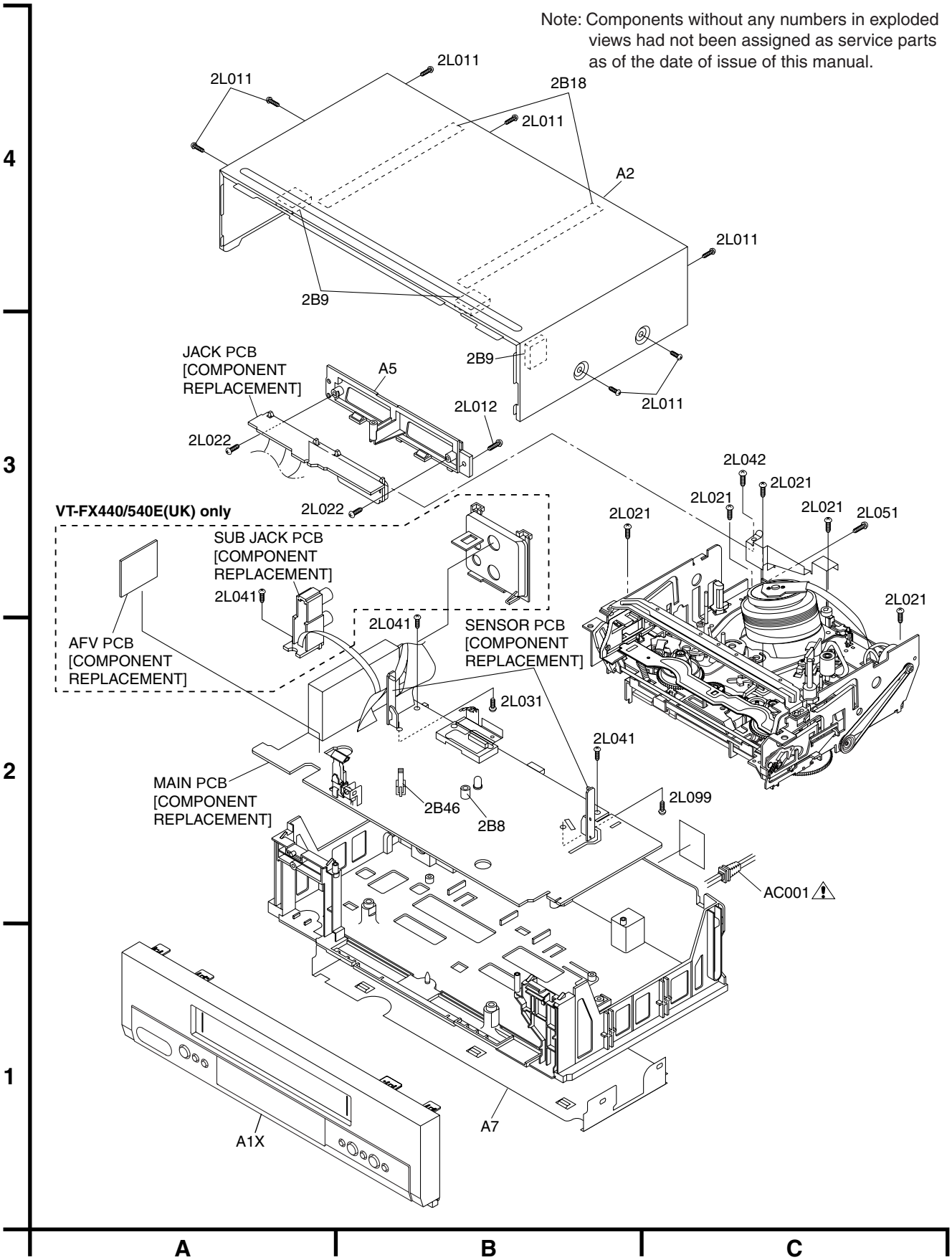
Fig. 5-4-13

6 EXPLODED VIEW AND PARTS LIST

6-1 EXPLODED VIEWS

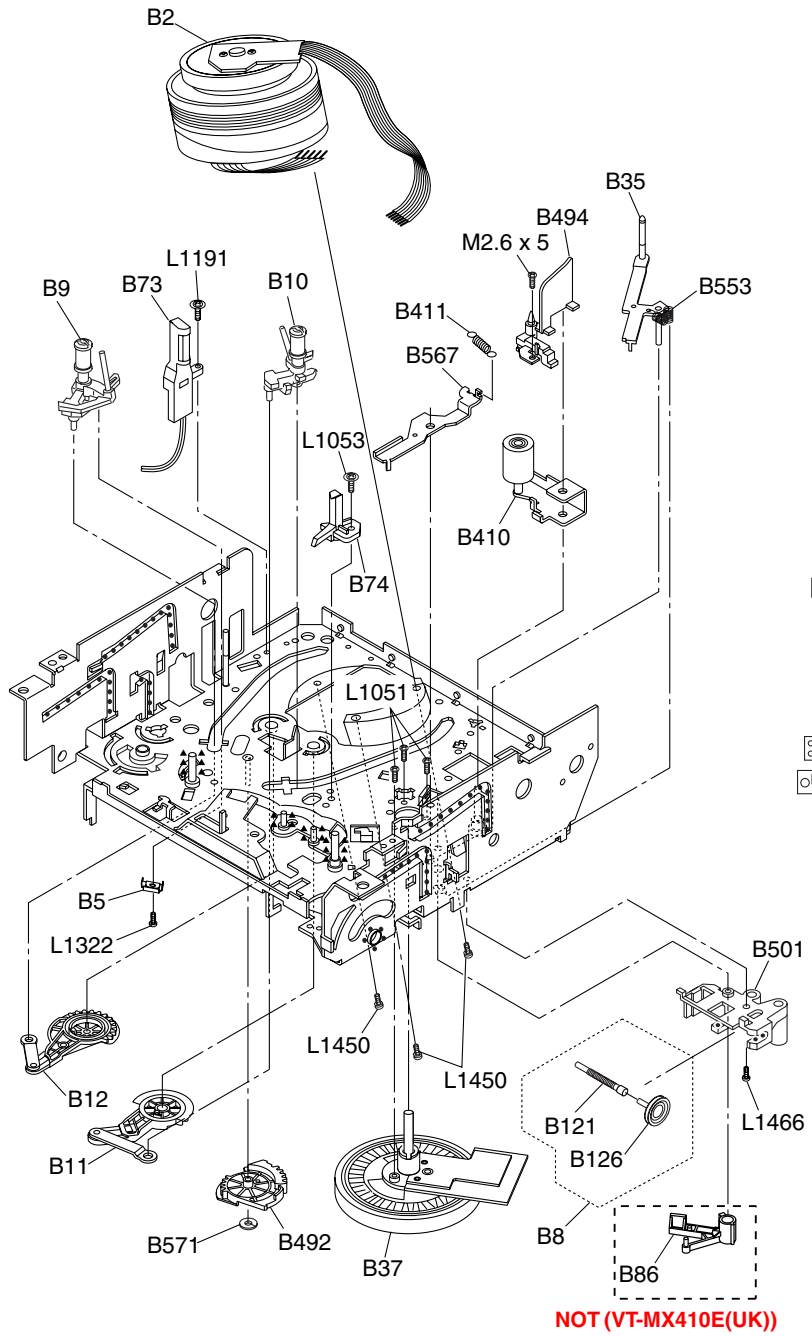
6-1-1 Cabinet Section

Note: Components without any numbers in exploded views had not been assigned as service parts as of the date of issue of this manual.

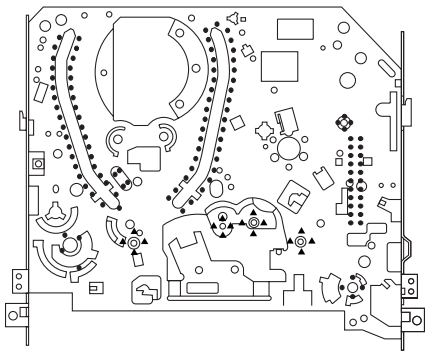


6-1-2 Deck Mechanism View 1 Section

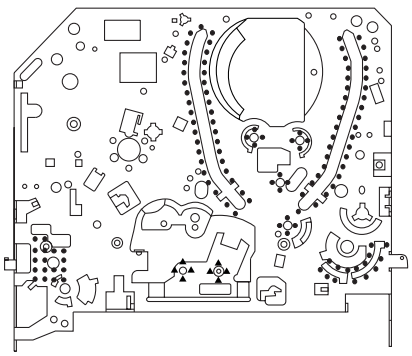
Mark	Description
●●●●●	Floil G-684G or Multemp MH-D (Blue grease)
▲▲▲▲▲	SLIDUS OIL #150



Some Ref. Numbers are not in sequence.

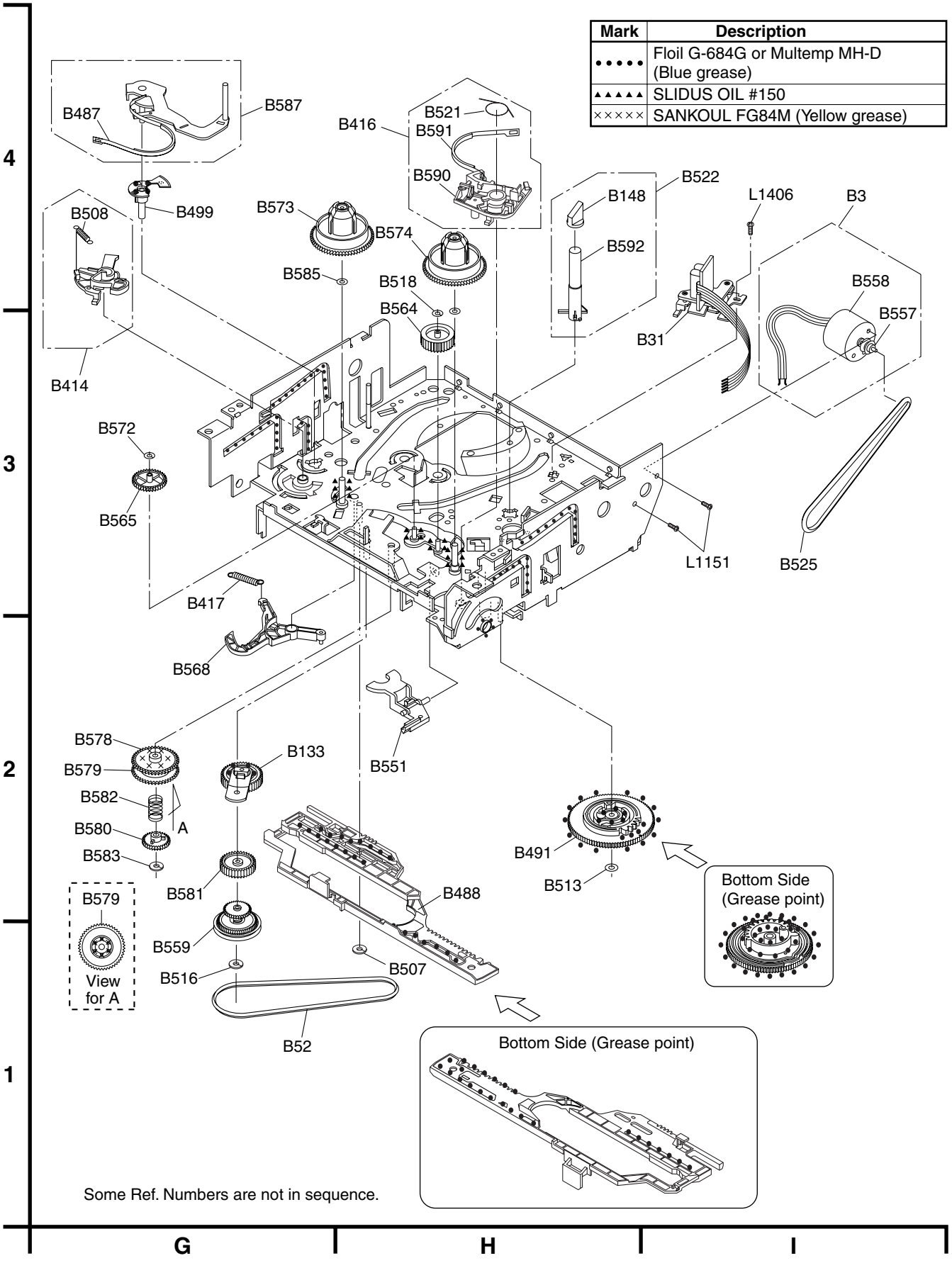


Chassis Assembly
Top View (Lubricating Point)



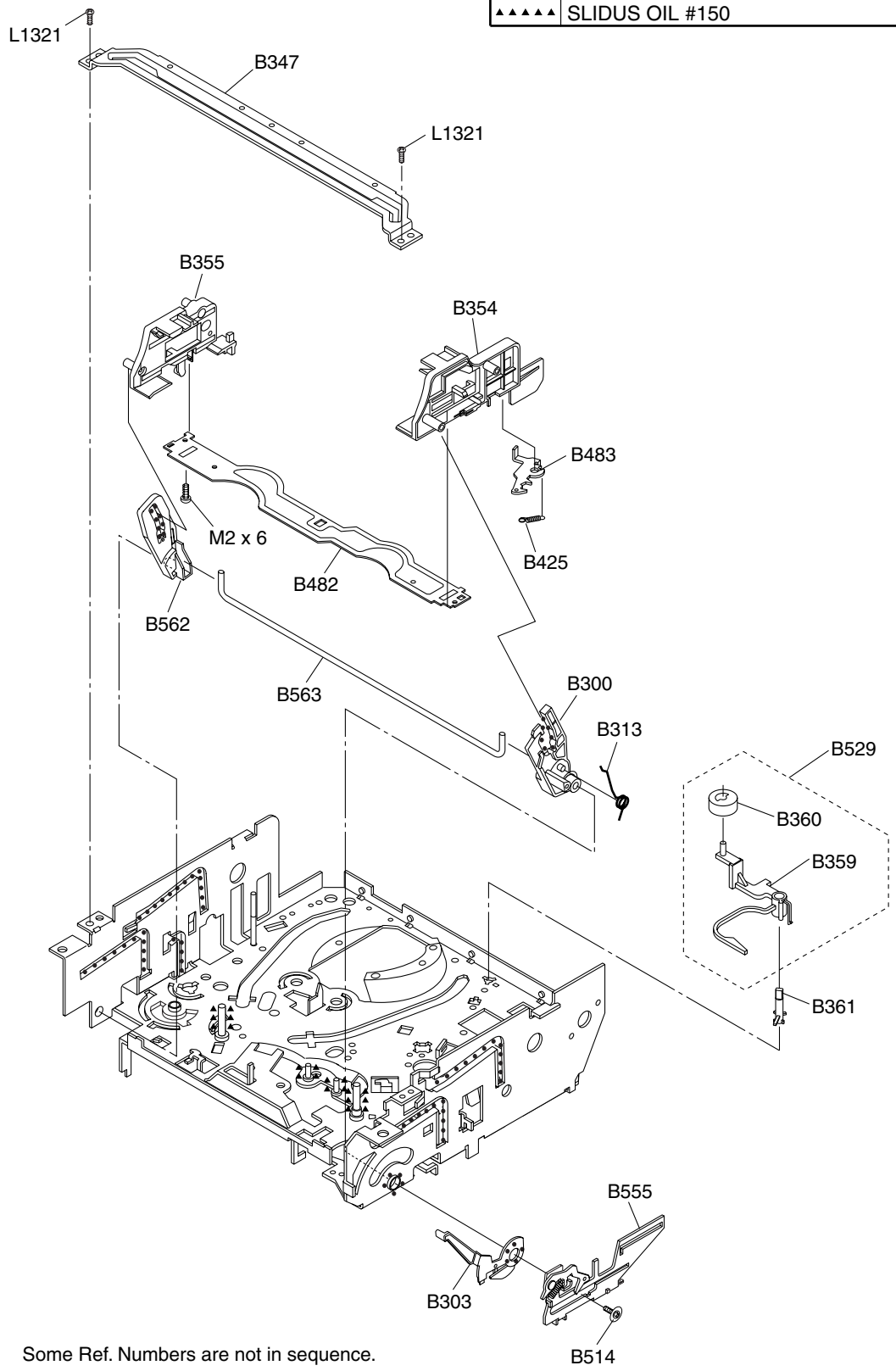
Chassis Assembly
Bottom View (Lubricating Point)

6-1-3 Deck Mechanism View 2 Section



6-1-4 Deck Mechanism View 3 Section

Mark	Description
●●●●●	Floil G-684G or Multemp MH-D (Blue grease)
▲▲▲▲▲	SLIDUS OIL #150



Some Ref. Numbers are not in sequence.

THE UPDATED PARTS LISTS

FOR THESE MODEL ARE

AVAILABLE ON ESTA

7 APPENDIX

7-1 SYSTEM CONTROL TIMING CHARTS

Mode SW : LD-SW

LD-SW Position detection A/D Input voltage Limit (Calculated voltage)	Symbol
3.76V~4.50V (4.12V)	EJ
4.51V~5.00V (5.00V)	CL
0.00V~0.25V (0.00V)	SB
1.06V~1.50V (1.21V)	TL
0.66V~1.05V (0.91V)	FB
1.99V~2.60V (2.17V)	SF
1.51V~1.98V (1.80V)	SM
3.20V~3.75V (3.40V)	AU
0.26V~0.65V (0.44V)	AL
4.51V~5.00V (5.00V)	SS
2.61V~3.19V (2.97V)	RS

Note:

Note:

EJ ⟶ RS: Loading FWD (LM-FWD/REV "H")

RS ⟶ EJ: Loading REV (LM-FWD/REV "L")

Stop (A) = Loading

Stop (B) = Unloading

Note:

Symbol	Loading Status
EJ	Eject
CL	Eject ~ REW Reel
SB	REW Reel ~ Stop(B)
TL	Stop(B) ~ Brake Cancel
FB	Brake Cancel ~ FF / REW
SF	FF / REW ~ Stop(M), (FF / REW)
SM	Stop(M), (FF / REW) ~ Stop(A)
AU	Stop(A) ~ Play / REC
AL	Play / REC ~ Still / Slow
SS	Still / Slow ~ RS (REW Search)
RS	RS (REW Search)

[VT-FX440/540E(UK)]

Still/Slow Control Frame Advance Timing Chart

1) SP Mode

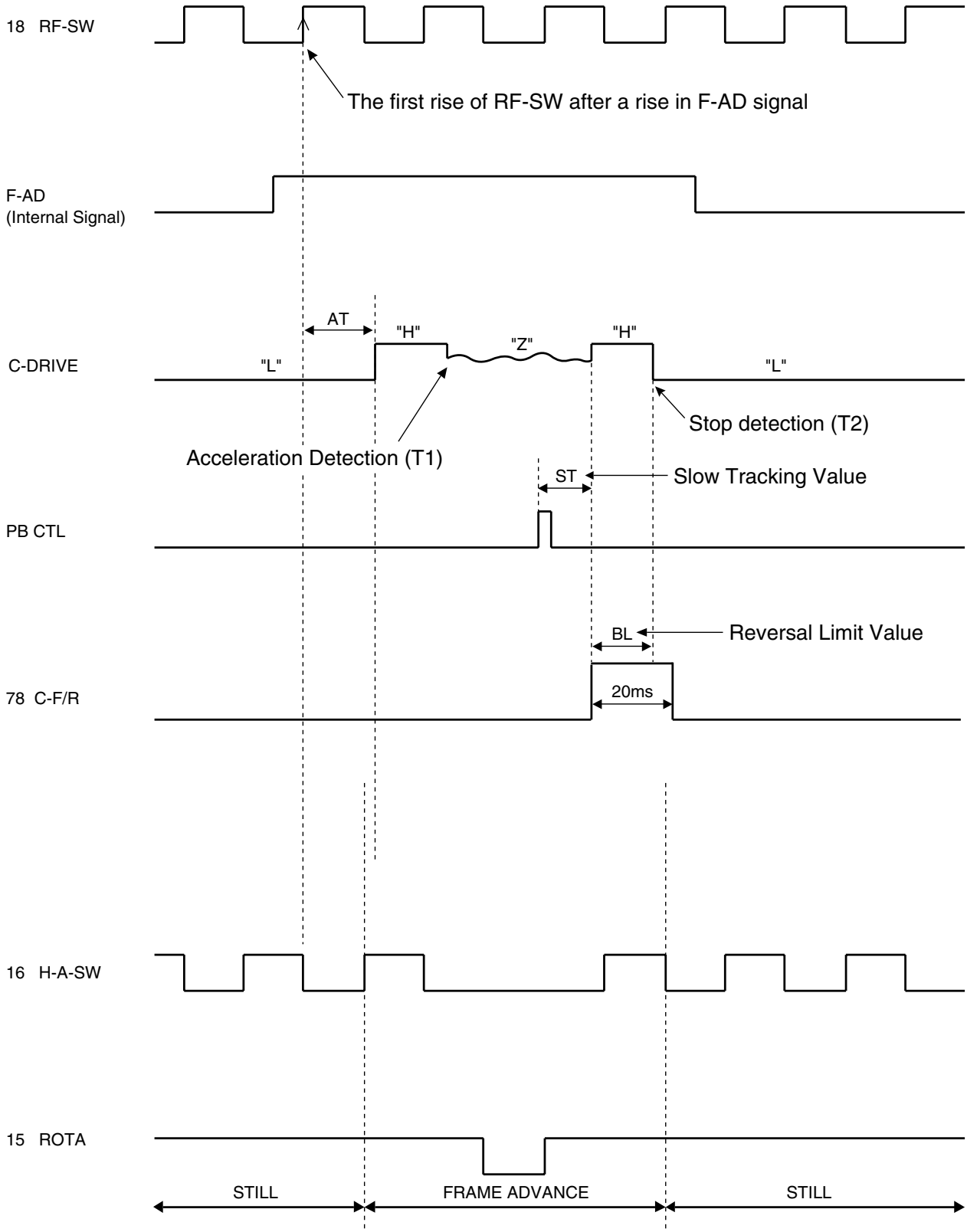


Fig. 1

2) LP Mode

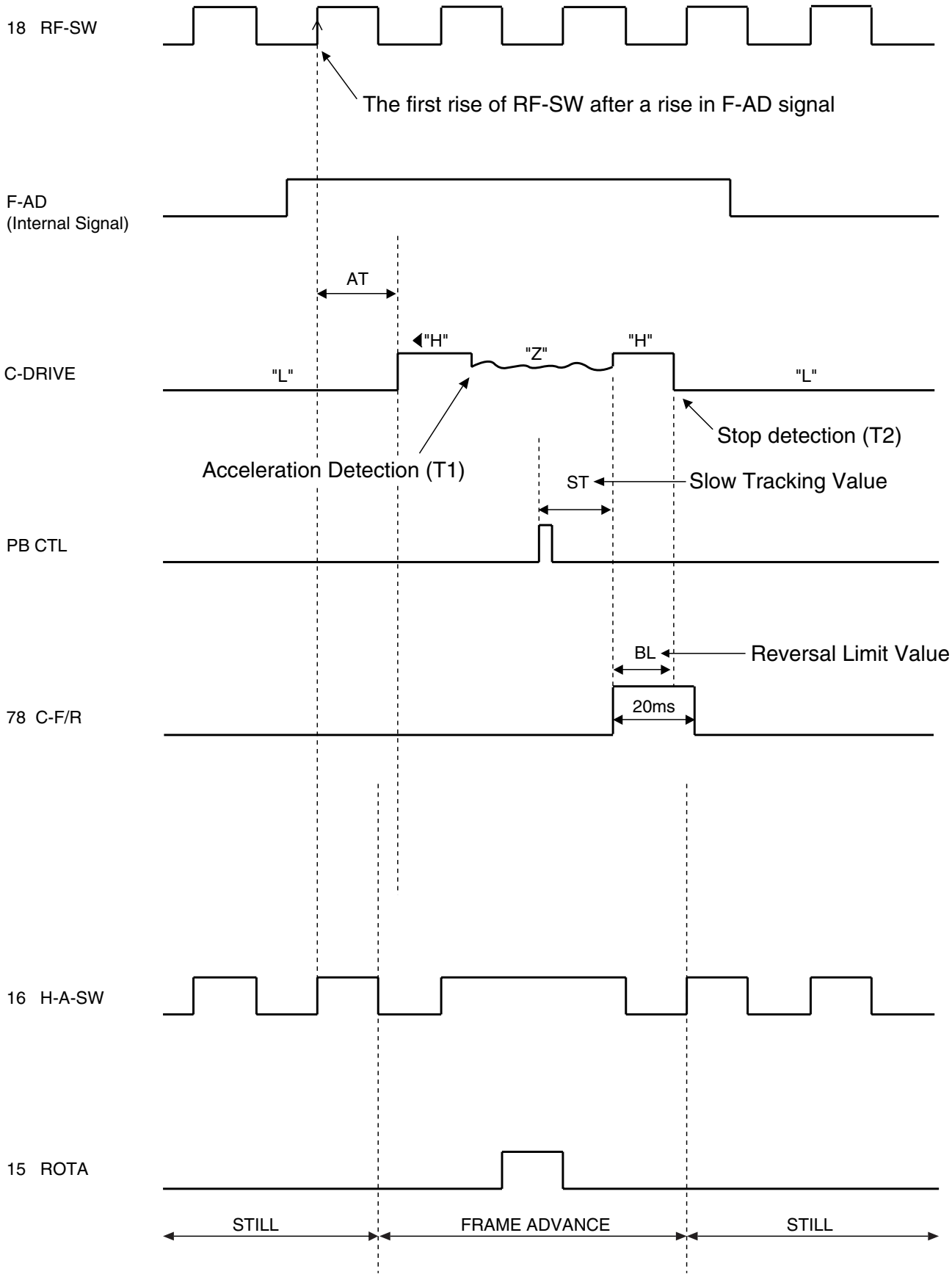


Fig. 2

1. EJECT (POWER OFF) -> CASSETTE IN (POWER ON) -> STOP(B) -> STOP(A) -> PLAY -> RS -> FS -> PLAY -> STILL -> PLAY -> STOP(A)

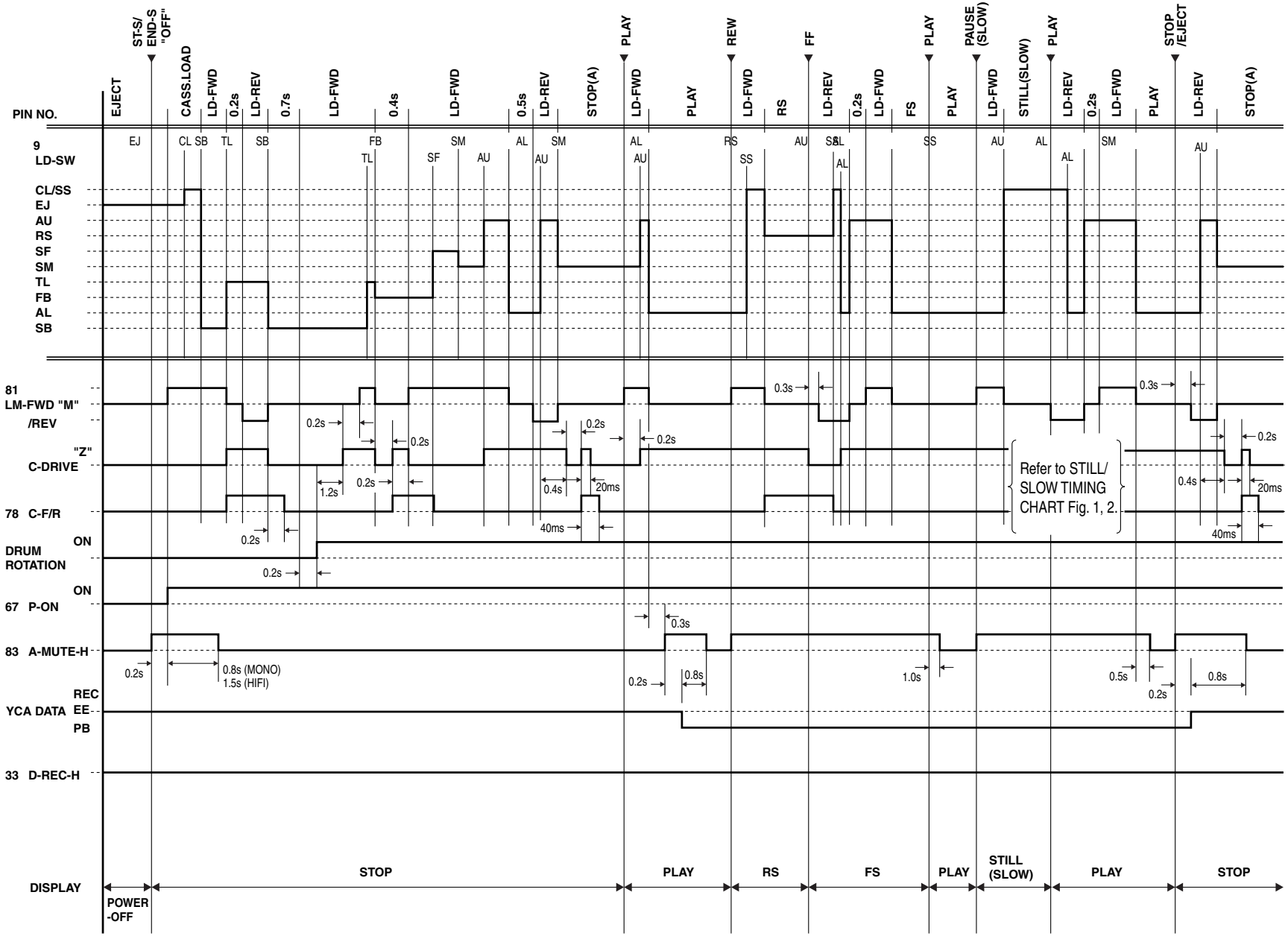


Fig. 3

2. STOP(A) -> FF -> STOP(A) -> REW -> STOP(A) -> REC -> PAUSE -> PAUSE or REC -> STOP(A) -> EJECT

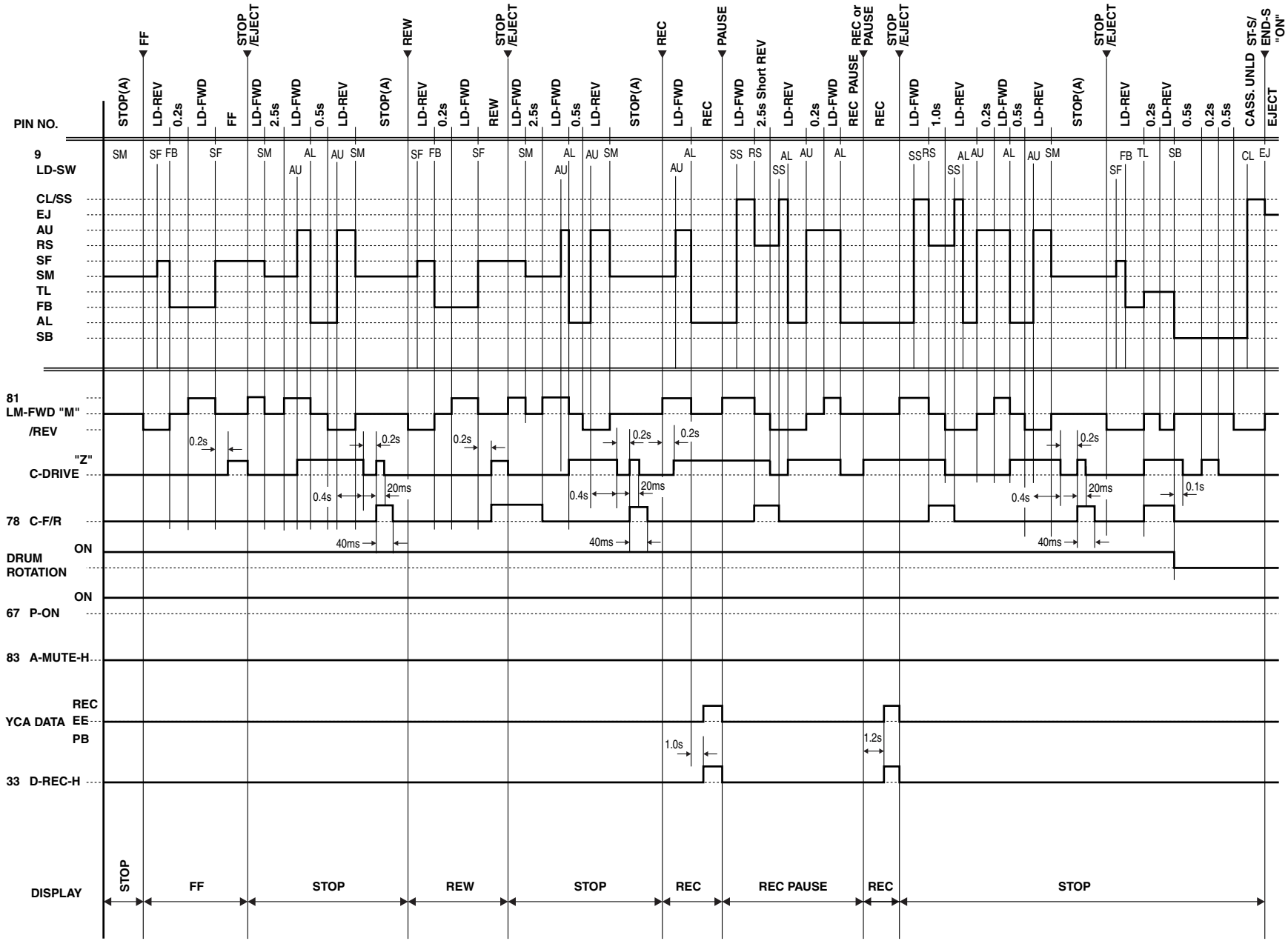


Fig. 4

1. EJECT (POWER OFF) -> CASSETTE IN (POWER ON) -> STOP(B) -> STOP(A) -> PLAY -> RS -> FS -> PLAY -> STILL -> PLAY -> STOP(A)

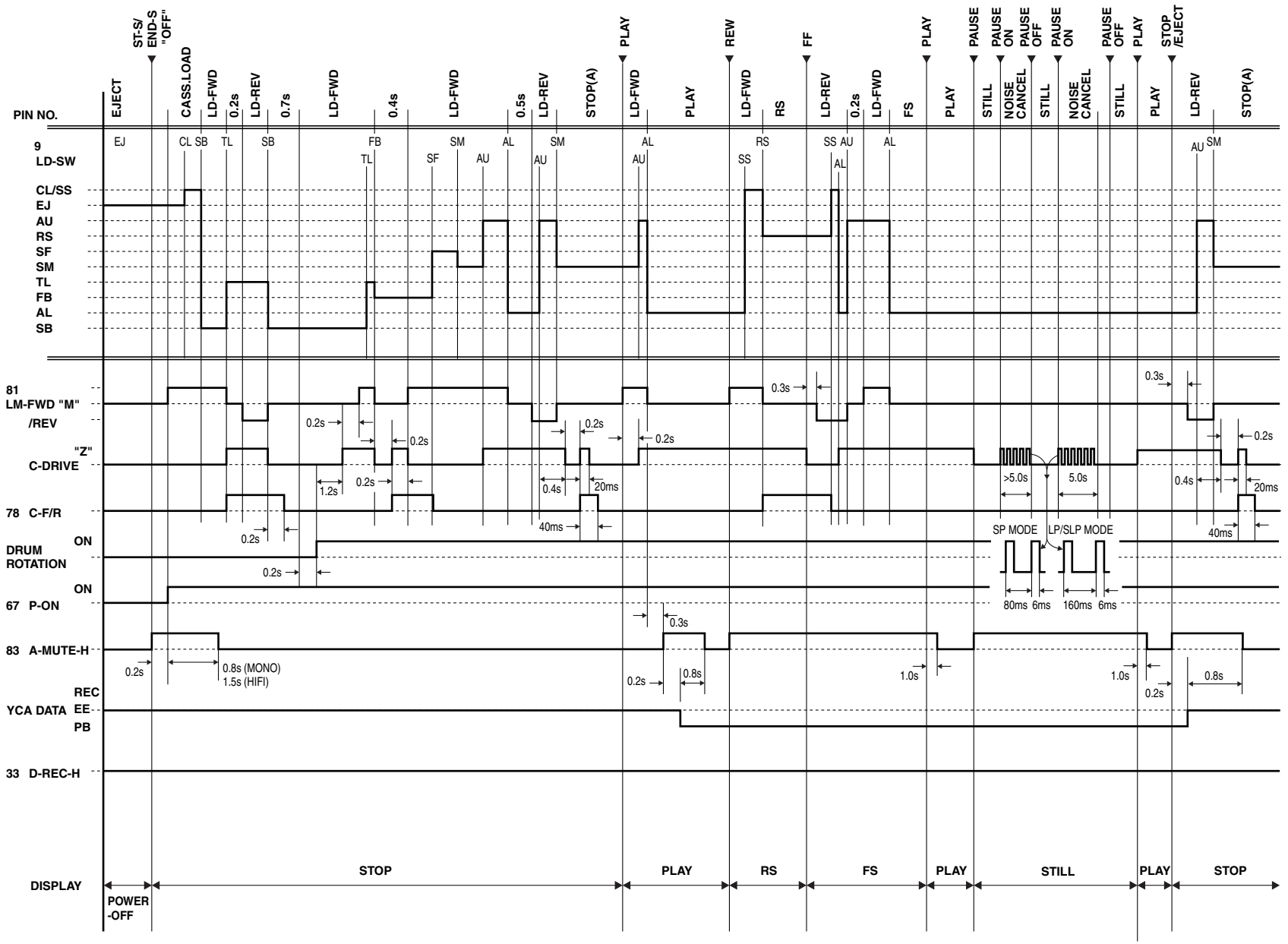


Fig. 5

[VT-MX410E(UK)]

2. STOP(A) -> FF -> STOP(A) -> REW -> STOP(A) -> REC -> PAUSE -> PAUSE or REC -> STOP(A) -> EJECT

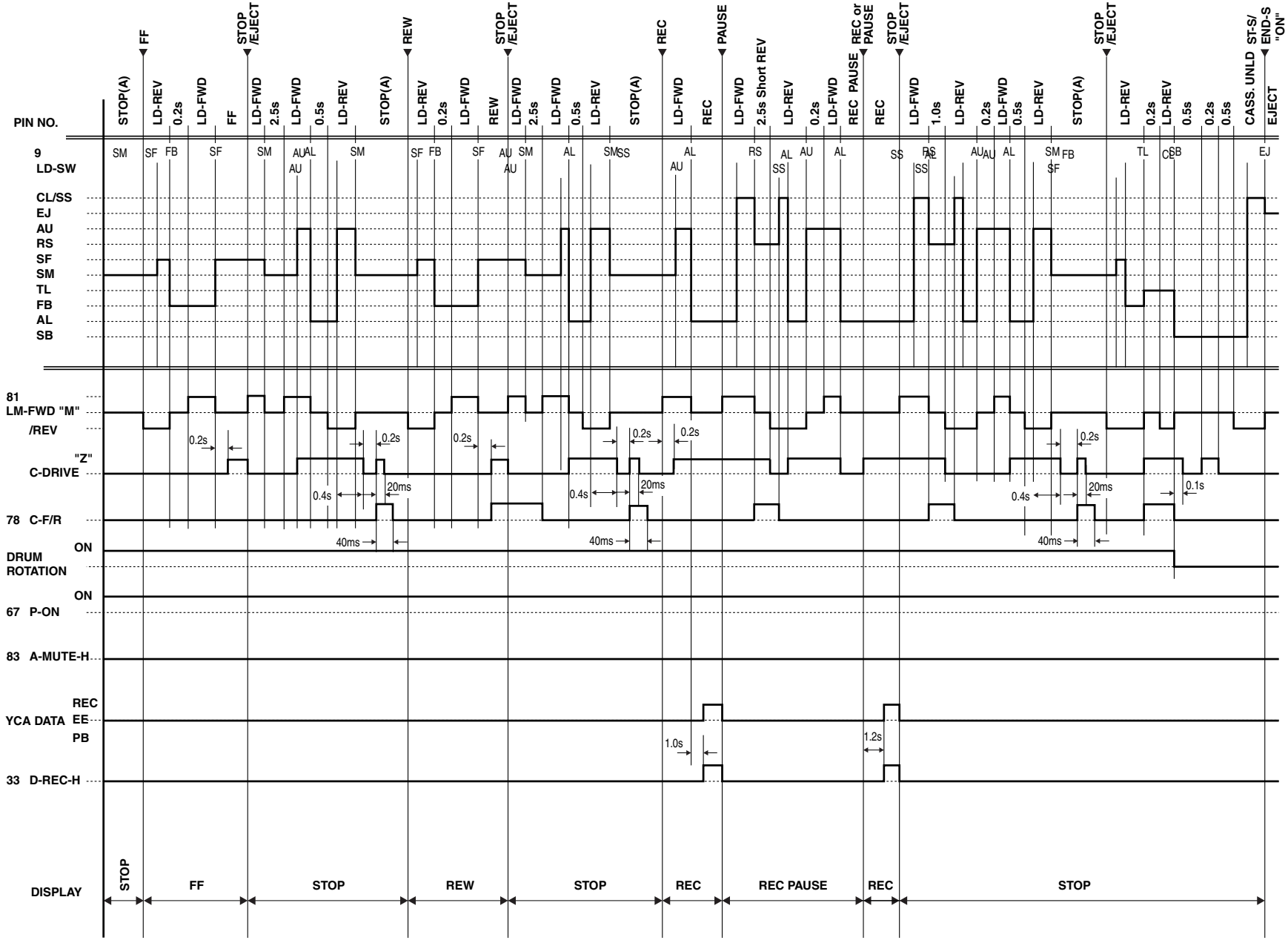


Fig. 6

7-2 IC PIN FUNCTION DESCRIPTIONS

Comparison Chart of Models and Marks

Model	Mark
VT-FX440E(UK)	A
VT-MX410E(UK)	B
VT-FX540E(UK)	C

IC501(SERVO / SYSTEM CONTROL IC)

"H" ≥ 4.5V, "L" ≤ 1.0V

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
1		IN	SC2-IN	Input Signal from Pin 8 of SCART2	A/D
2		IN	PG-DELAY	Video Head Switching Pulse Signal Adjusted Voltage	A/D
3		IN	POW-SAF	P-ON Power Detection Input Signal	A/D
4		IN	END-S	Tape End Position Detect Signal	A/D
5		IN	AFC	Automatic Frequency Control Signal	A/D
6		IN	V-ENV	Video Envelope Comparator Signal	A/D
7		IN	KEY-1	Key Scan Input Signal 1	A/D
8		IN	KEY-2	Key Scan Input Signal 2	A/D
9		IN	LD-SW	Deck Mode Position Detector Signal	A/D
10		OUT	ST-S	Tape Start Position Detector Signal	A/D
11		-	NU	Not Used	-
12		-	NU	Not Used	-
13		OUT	D-V-SYNC	Dummy V-sync Output	H/ Hi-z
14		IN	REMOCON-IN	Remote Control Sensor	L
15		OUT	C-ROTA	Color Phase Rotary Changeover SIgnal	H/L
16		OUT	H-A-SW	Video Head Amp Switching Pulse	H/L
	B	-	NU	Not Used	-
17		IN	H-A-COMP	Head Amp Comparator Signal	H/L
	B	-	NU	Not Used	-
18		OUT	RF-SW	Video Head Switching Pulse	H/L
19	A	OUT	Hi-Fi-H-SW	HiFi Audio Head Switching Pulse	H/L
	B	-	NU	Not Used	-
20		-	NU	Not Used	-
21		-	NU	Not Used	-
22		-	NU	Not Used	-
23		-	NU	Not Used	-
24		-	NU	Not Used	-
25		-	NU	Not Used	-
26		-	NU	Not Used	-
27		-	NU	Not Used	-
28		OUT	LINE-MUTE	Audio Mute Control Signal	H
	B	-	NU	Not Used	-
29		-	NU	Not Used	-
	B	OUT	AUDIO-SW-1	Audio IN/OUT Control Signal	H/L
30		-	NU	Not Used	-
	B	OUT	AUDIO-SW-2	Audio IN/OUT Control Signal	H/L
31		IN	REC-SAF-SW	Recording Safety SW Detect (With Record tab="L"/ With out Record tab="H")	H
32		IN	A-MODE	Hi-Fi Tape Detection Signal	L
	B	-	NU	Not Used	-
33		OUT	D-REC-H	Delayed Record Signal	H
34		IN	RESET	System Reset Signal (Reset="L")	L
35		IN	Xcin	Sub Clock	-
36		OUT	Xcout	Sub Clock	-
37		-	Vcc	Vcc	-
38		IN	Xin	Main Clock Input	-
39		OUT	Xout	Main Clock Input	-
40		-	Vss	Vss(GND)	-
41		-	NU	Not Used	-
42		-	NU	Not Used	-

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
43		IN	CLKSEL	Clock Select (GND)	-
44		IN	OSCin	Clock Input for letter size	-
45		OUT	OSCout	Clock Output for letter size	-
46		-	NU	Not Used	-
47		-	LP	LP	-
48		IN	FSC-IN [4.43MHz]	4.43MHz Clock Input	-
49		-	OSDVss	OSDVss	-
50		IN	OSD-V-IN	OSD Video Signal Input	-
51		-	NU	Not Used	-
52		OUT	OSD-V-OUT	OSD Video Signal Output	-
53		-	OSDVcc	OSDVcc	-
54		-	HLF	LPF Connected Terminal (Slicer)	-
55		-	NU	Not Used	-
56		IN	DAVN-L	VPS/PDC Data Receive = “L”	L
57		-	NU	Not Used	-
58		IN	C-SYNC	Composite Synchronized Pulse	PUL SE
59		OUT	8POUT-1	SCART 1 8Pin Output Control Signal	H/L
60		-	NU	Not Used	-
61		-	NU	Not Used	-
62		OUT	SD-H	SD-H	-
	C	-	NU	Not Used	-
63		-	NU	Not Used	-
64		IN	FTV-IN	Comparator Input of Video Signal for Follow TV	L/H
	C	-	NU	Not Used	-
65		-	NU	Not Used	-
66		OUT	C-POW-SW	Capstan Power Switching Signal	H/L
67		OUT	P-ON-H	Power On Signal at High	H
68		OUT	DRV-DATA	LED Clock Driver IC Control Data	H/L
69		OUT	DRV-STB	LED Clock Driver IC Chip Select Signal	H/L
70		OUT	DRV-CLK	LED Clock Driver IC Control Clock	H/L
71		OUT	IIC BUS-SCL	I^2C BUS Control Clock	H/L

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
72		IN/ OUT	IIC BUS-SDA	I^2C BUS Control Data	H/L
73		-	NU	Not Used	-
74		-	NU	Not Used	-
75		-	NU	Not Used	-
76		OUT	C-CONT	Capstan Motor Control Signal	PWM
77		OUT	D-CONT	Drum Motor Control Signal	PWM
78		OUT	C-F/R	Capstan Motor FWD/REV Control Signal (FWD=”L”/ REV=”H”)	H/L
79		IN	S-REEL	Supply Reel Rotation Signal	PUL SE
80		IN	T-REEL	Take Up Reel Rotation Signal	PUL SE
81		OUT	LM-FWD/ REV	Loading Motor Control Signal	H/L/ Hi-z
82		-	NU	Not Used	-
83		OUT	A-MUTE	Audio Mute Control Signal (Mute = “H”)	H
84		-	NU	Not Used	-
85		-	NU	Not Used	-
86		IN	P-DOWN-L	Power Voltage Down Detector Signal	L
87		IN	C-FG	Capstan Motor Rotation Detection Pulse	PUL SE
88		-	NU	Not Used	-
89		-	NU	Not Used	-
90		IN	D-PFG	Drum Motor Pulse Generator	PUL SE
91		-	AMPVREF OUT	V-Ref for CTL AMP	-
92		-	AMPVREFin	V-Ref for CTL AMP	-
93		-	P80/C	P80/C Terminal	-
94		IN/ OUT	CTL(-)	Playback/ Record Control Signal (-)	H/L
95		IN/ OUT	CTL(+)	Playback/ Record Control Signal (+)	H/L
96		-	AMPC	CTL AMP Connected Terminal	-
97		-	CTLAMPout	To Monitor for CTL AMP Output	PUL SE
98		-	AMPVcc	AMPVcc	-

Pin No.	Mark	IN/ OUT	Signal Name	Function	Active Level
99		-	AVcc	A/D Converter Power Input/ Standard Voltage Input	-
100		IN	AGC	IF AGC Comparator Signal	A/D

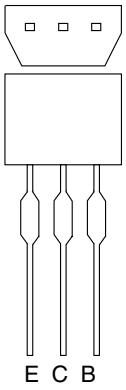
Notes:

Abbreviation for Active Level:

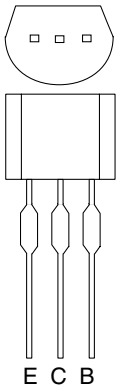
PWM -----Pulse Wide Modulation

A/D--------Analog - Digital Converter

7-3 LEAD IDENTIFICATIONS

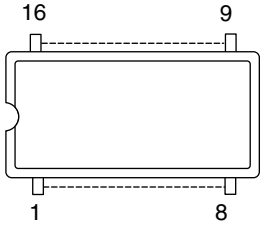


2SC2785(F,H,J)
BA1F4M-T
BN1F4M-T
BN1L4M-T
KRA103M
KRA104M
KRC103M
KTA1266(GR)
KTA1281(Y)
KTC3199(BL,GR,Y)

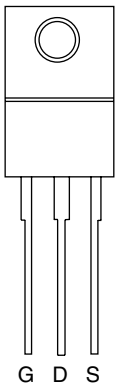


2SA1015-GR(TPE2)
2SA1020(Y)
2SC1815-BL(TPE2)
2SC1815-GR(TPE2)
2SC1815-Y(TPE2)
2SC2120-Y(TPE2)
2SC3266-Y(TPE2)
KTA1267(GR,Y)
KTC3203(Y)
KTC3205(Y)

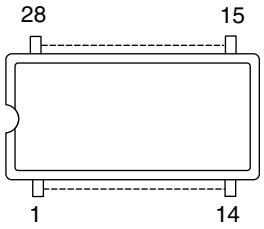
BU4052BCF-E2
CD4052BCSJX
TC4052BF(EL)



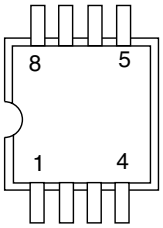
2SK3566



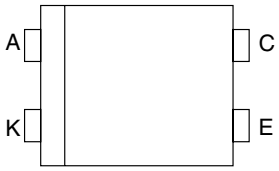
PT6958-FN-TP



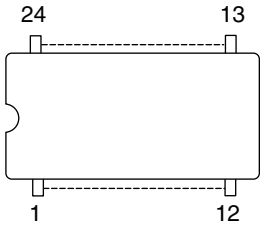
BR24L02F-WE2
CAT24WC02JI



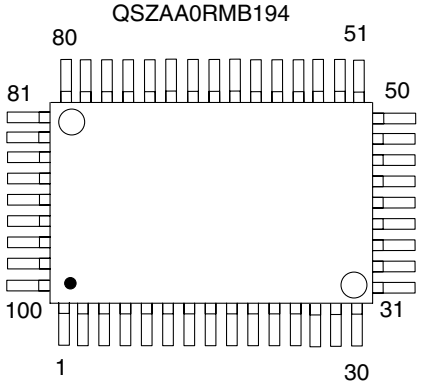
LTV-817B-F
LTV-817C-F



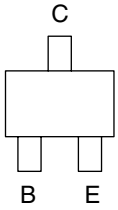
LC74793JM-TRM



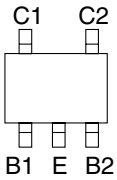
LA71750EM-MPB-E
QSZAA0RMB194



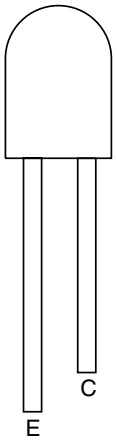
FA1F4M-T1B
KRC103S RTK
KTA1504GR-RTK
KTA1504Y-RTK
KTC3875Y-RTK



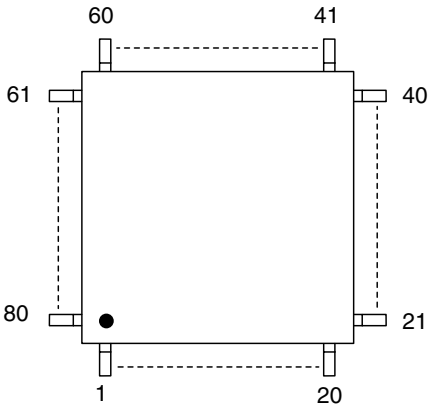
RN1511(TE85R)
FMG4A T148



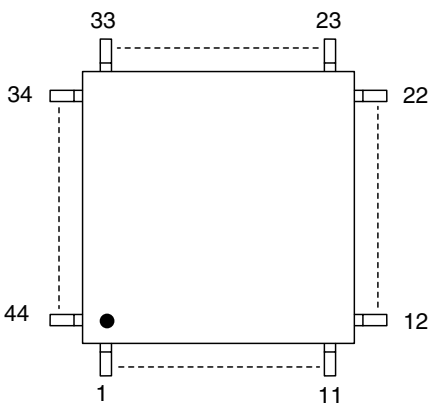
MID-32A22F
PT204-6B-12



LA72648M-MPB-E



MSP3407G-QG-B8
MSP3407G-QG-B8-V3



MSP3417G-QG-B8
MSP3417G-QG-B8-V3

Note:
A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference
S: Source
G: Gate
D: Drain

Block / Schematic / PCB Diagrams

VT-MX410E(UK)

VT-FX440E(UK)

S SCHEMATIC, WIRING DIAGRAMS

S-1 Schematic Diagrams / PCB's and Test Points

Standard Notes

WARNING

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark " ⚠ " in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

Capacitor Temperature Markings

Mark	Capacity change rate	Standard temperature	Temperature range
(B)	±10%	20°C	-25~+85°C
(F)	+30 - 80%	20°C	-25~+85°C
(SR)	±15%	20°C	-25~+85°C
(Z)	+30 - 80%	20°C	-10~+70°C

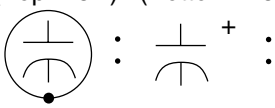
Notes:

1. Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
2. All resistance values are indicated in ohms ($K=10^3$, $M=10^6$).
3. Resistor wattages are 1/4W or 1/6W unless otherwise specified.
4. All capacitance values are indicated in μF ($P=10^{-6}$ μF).
5. All voltages are DC voltages unless otherwise specified.
6. Electrical parts such as capacitors, connectors, diodes, IC's, transistors, resistors, switches, and fuses are identified by four digits. The first two digits are not shown for each component. In each block of the diagram, there is a note such as shown below to indicate these abbreviated two digits.

Capacitors and transistors are represented by the following symbols.

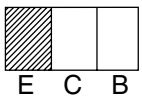
CBA Symbols

(Top View) (Bottom View)



Electrolytic Capacitor

(Bottom View)



E C B

Transistor or Digital Transistor

(Top View)

E C B

NPN Transistor

(Top View)

E C B

PNP Transistor

(Top View)

E C B

NPN Digital Transistor

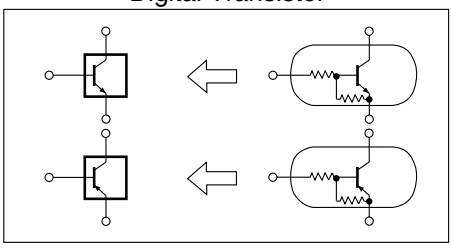
(Top View)

E C B

PNP Digital Transistor

Schematic Diagram Symbols

Digital Transistor



LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:

1. CAUTION:

FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.

2. CAUTION:

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F1001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

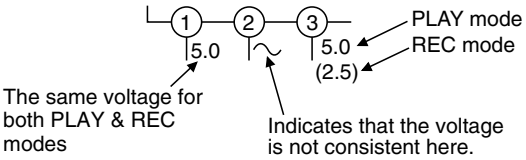
3. Note:

(1) Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.

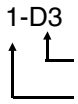
(2) To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

4. Voltage indications for PLAY and REC modes on the schematics are as shown below:

Unit: Volts

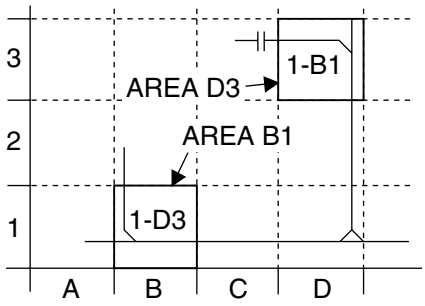


5. How to read converged lines



Examples:

1. "1-D3" means that line number "1" goes to area "D3".
2. "1-B1" means that line number "1" goes to area "B1".



6. Test Point Information

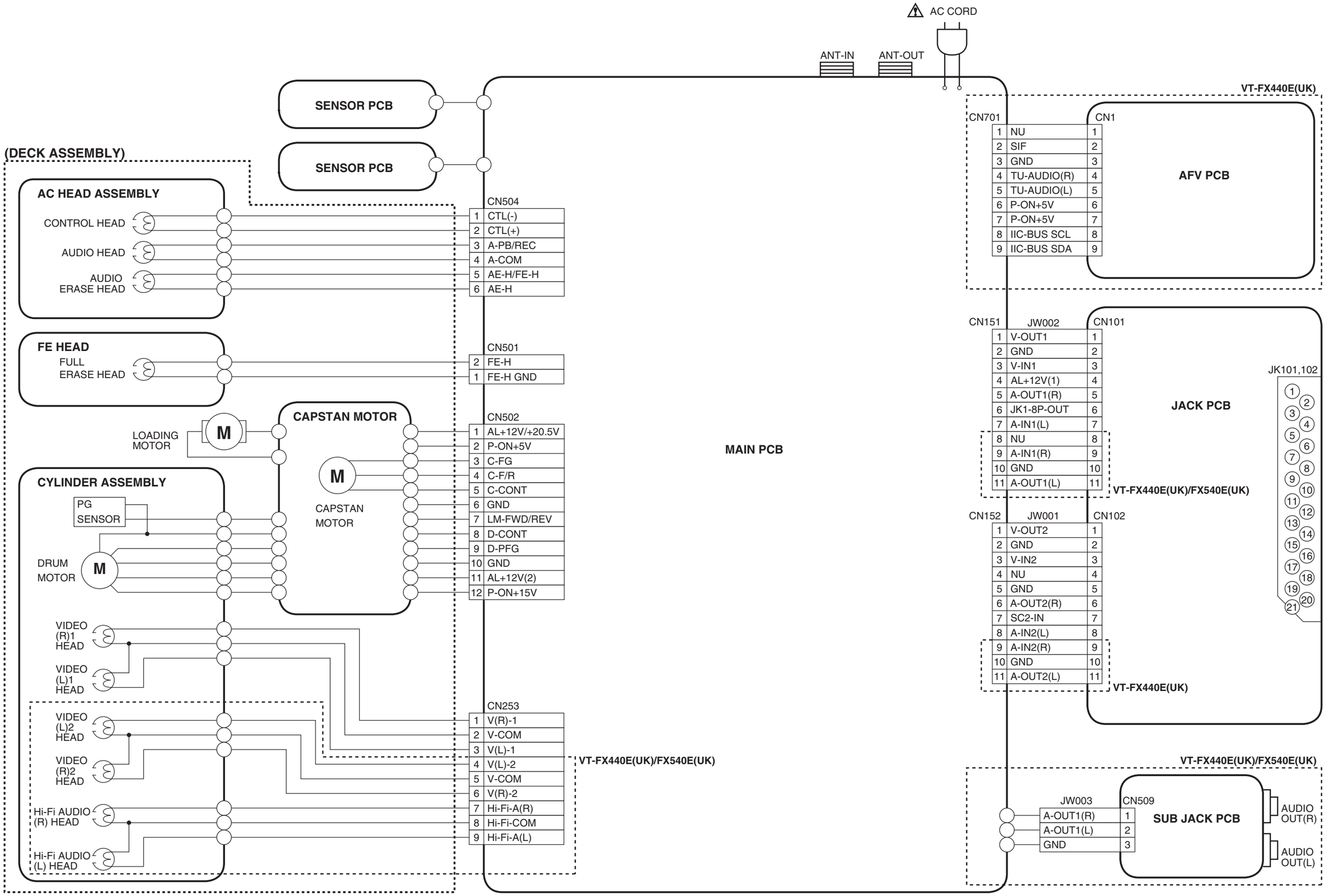
: Indicates a test point with a jumper wire across a hole in the PCB.

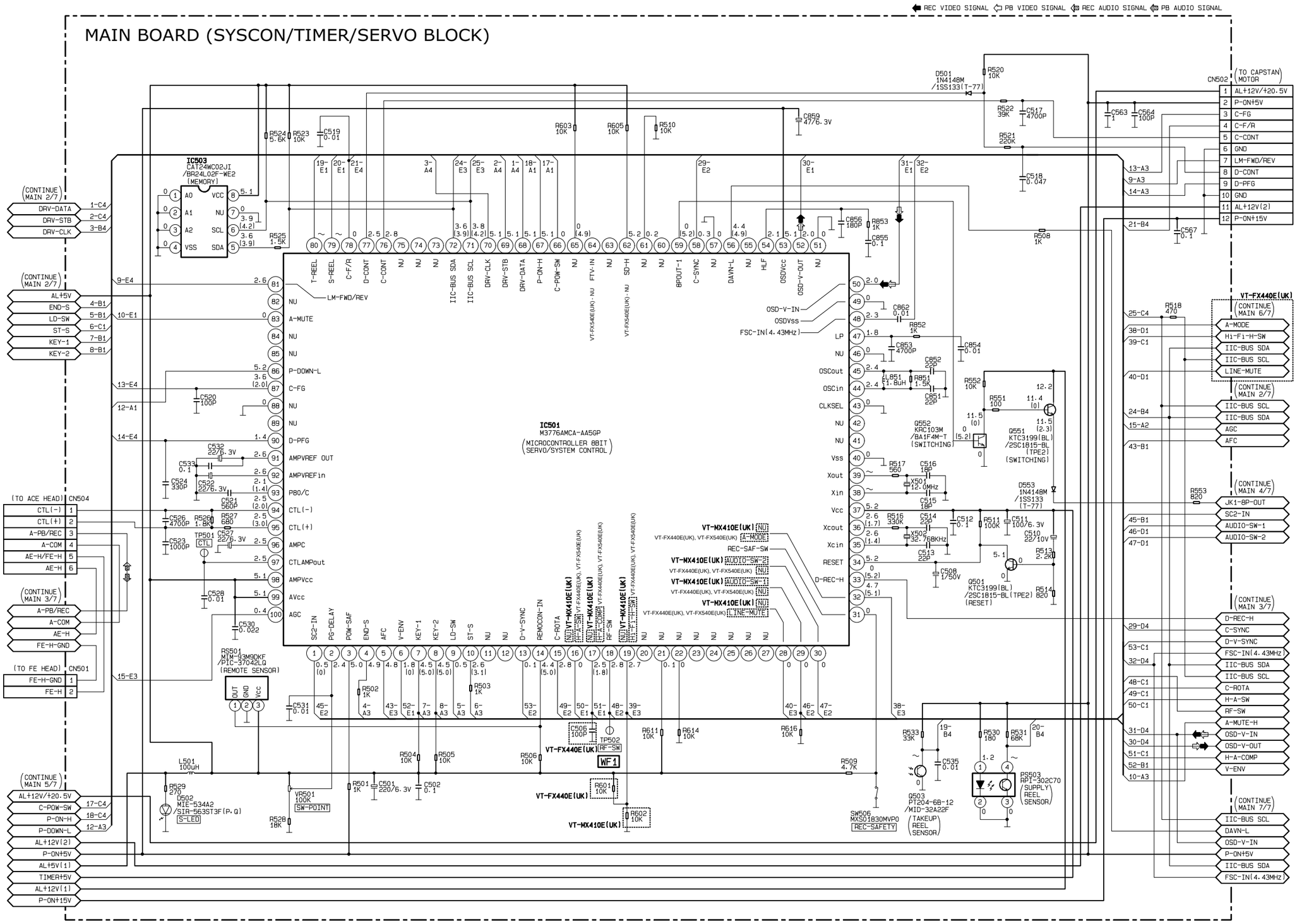
: Used to indicate a test point with a component lead on foil side.

: Used to indicate a test point with no test pin.

: Used to indicate a test point with a test pin.

S-2 Wiring Diagrams

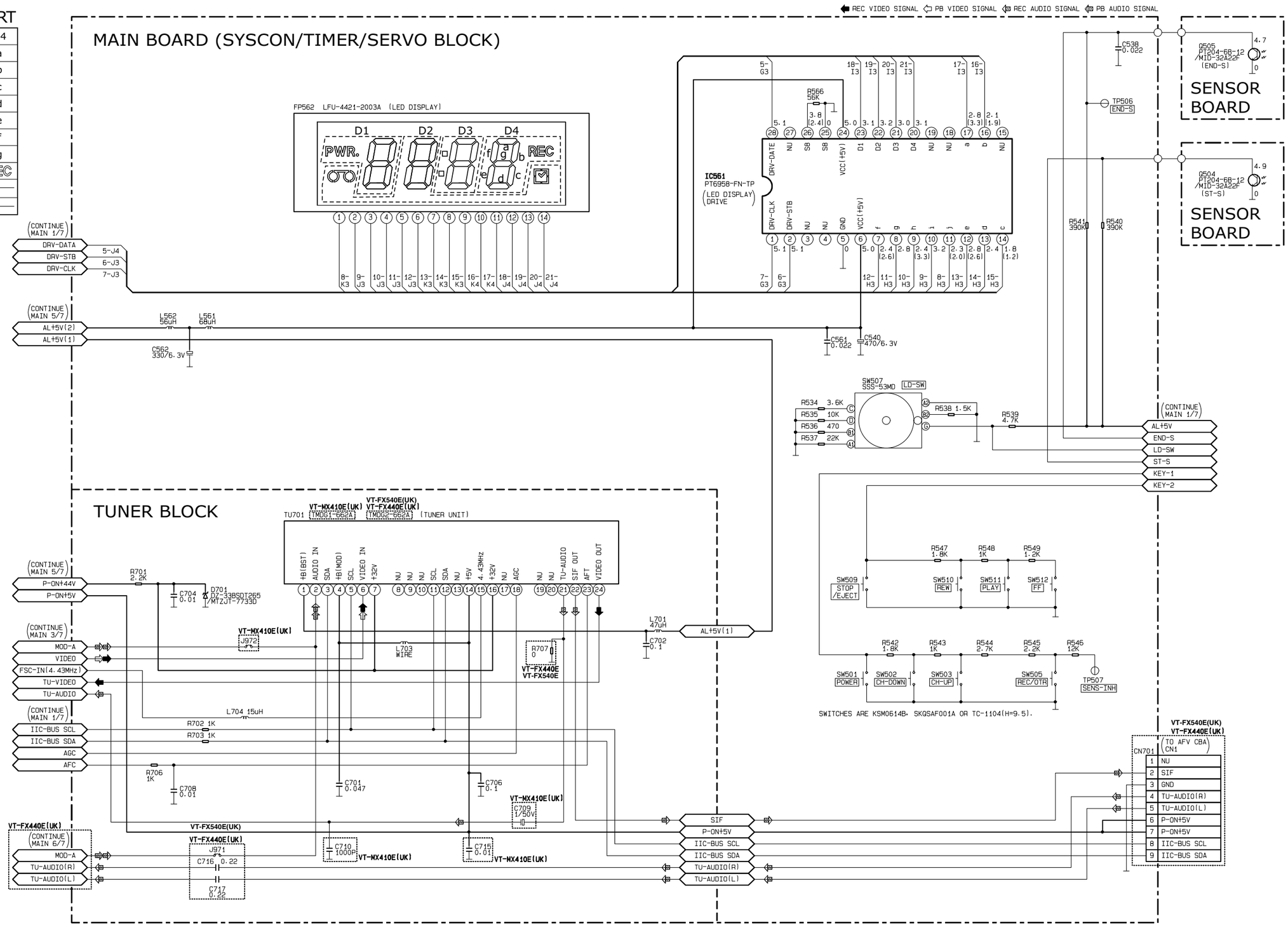




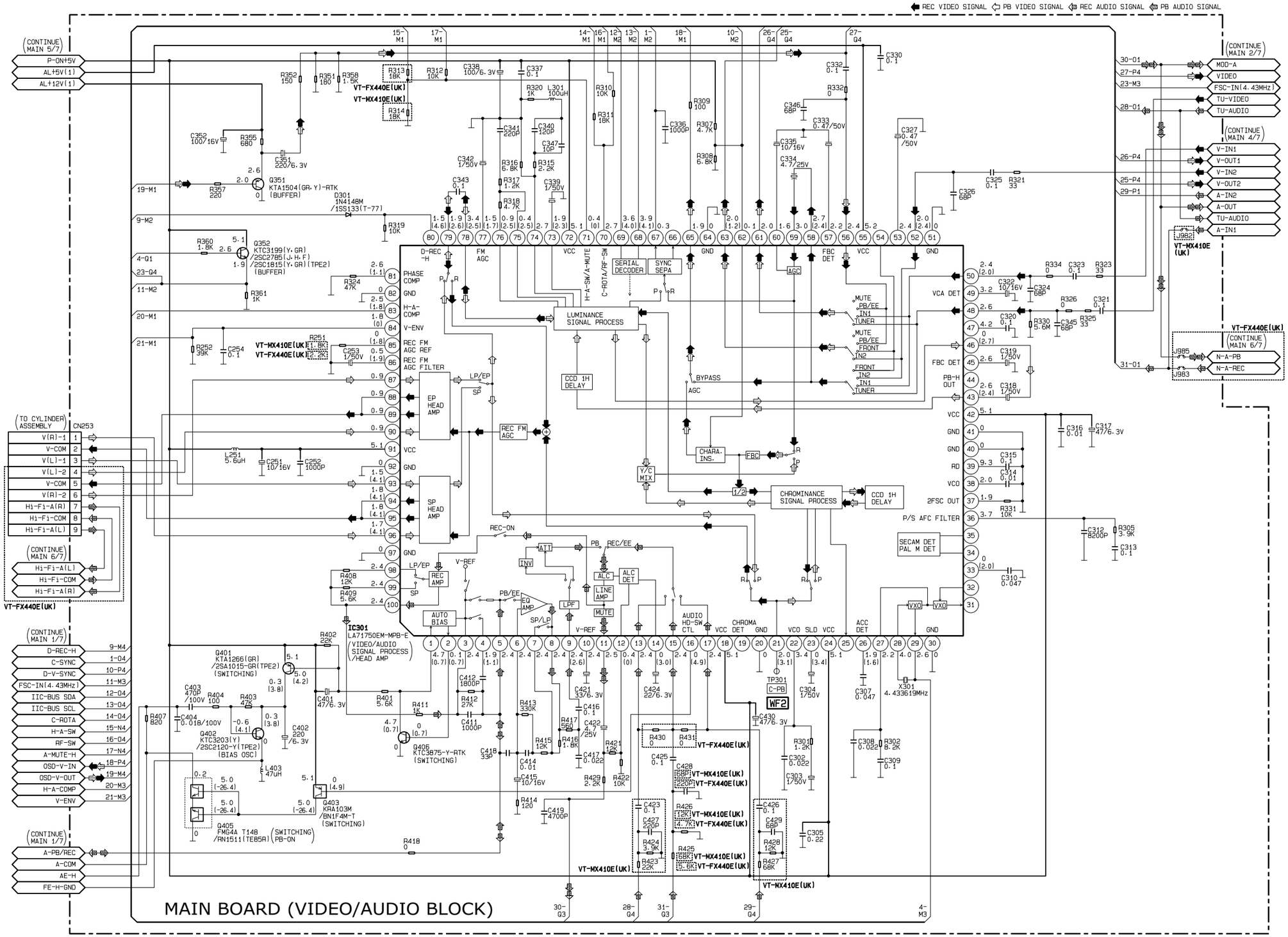
MAIN BOARD (SYSCON/TIMER/SERVO BLOCK)

FP562 MATRIX CHART

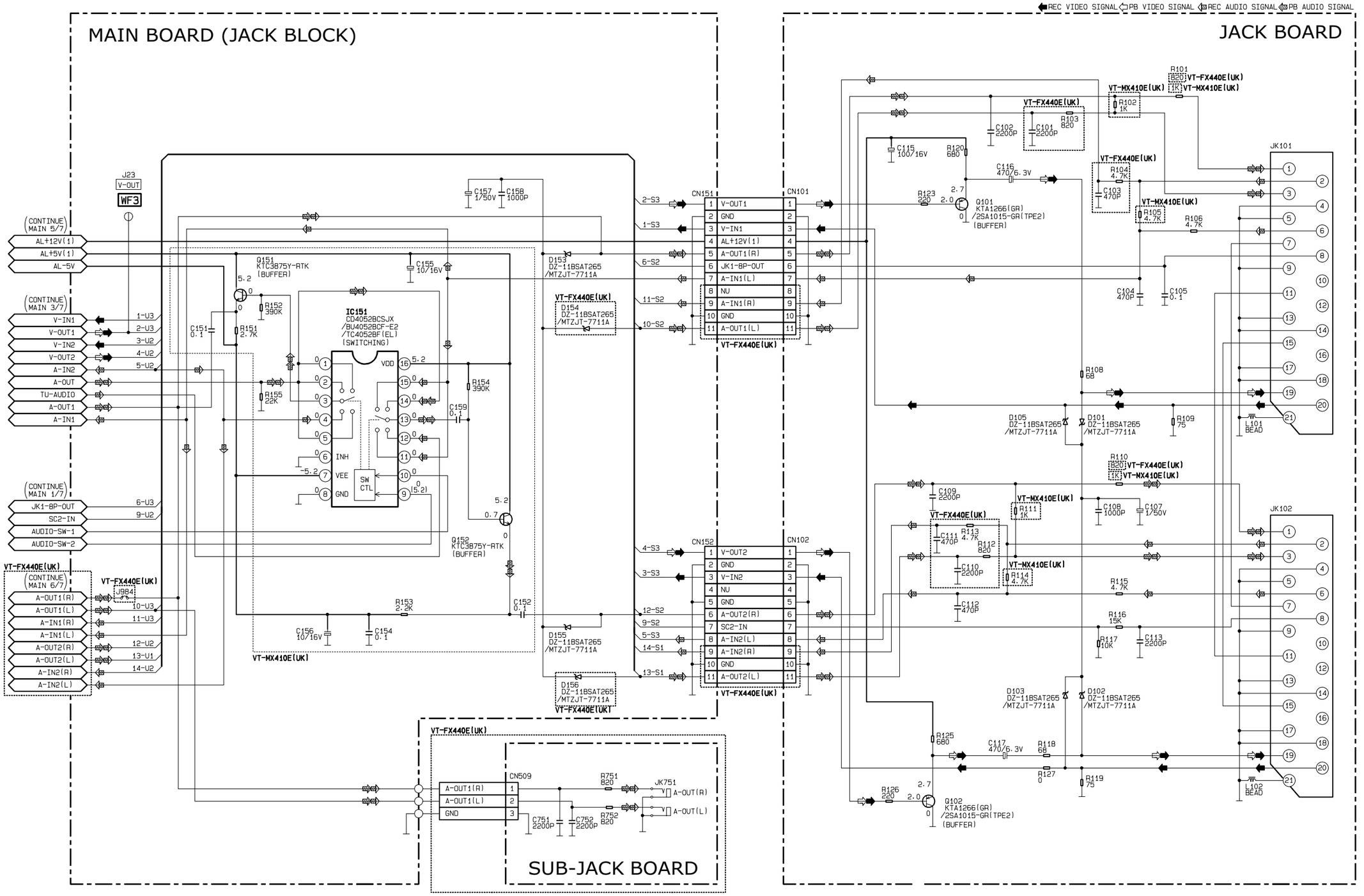
	D1	D2	D3	D4
a	a	a	a	a
b	b	b	b	b
c	c	c	c	c
d	d	d	d	d
e	e	e	e	e
f	f	f	f	f
g	g	g	g	g
h	——	——	——	REC
i	PWR.	◎	——	——
j	——	☑	▫ ▫	——



MAIN (SYSCON/TIMER/SERVO/TUNER BLOCKS) & SENSOR BOARDS



MAIN BOARD (VIDEO/AUDIO BLOCK)

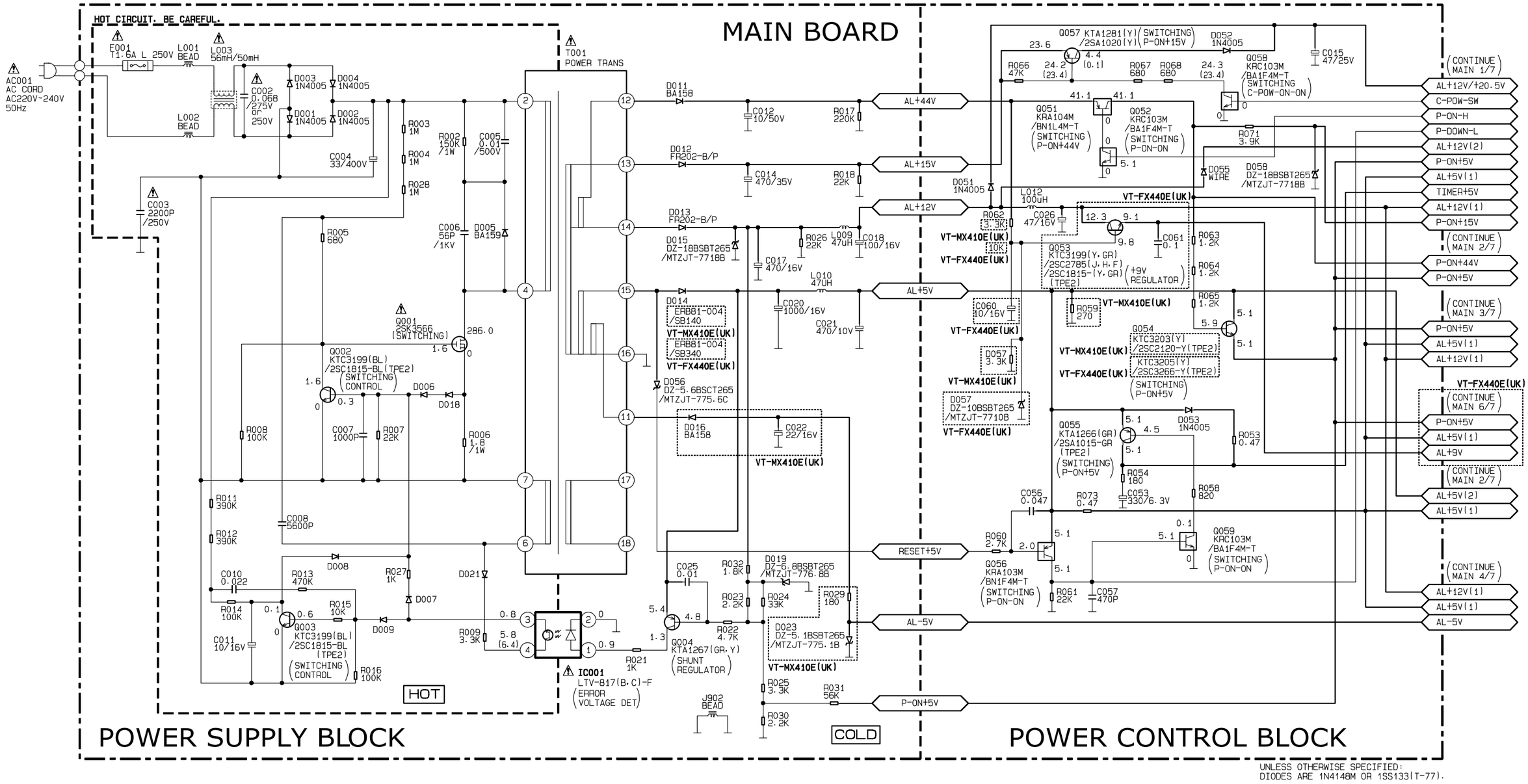


MAIN (JACK BLOCK), JACK & SUB-JACK BOARDS

NOTE:
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

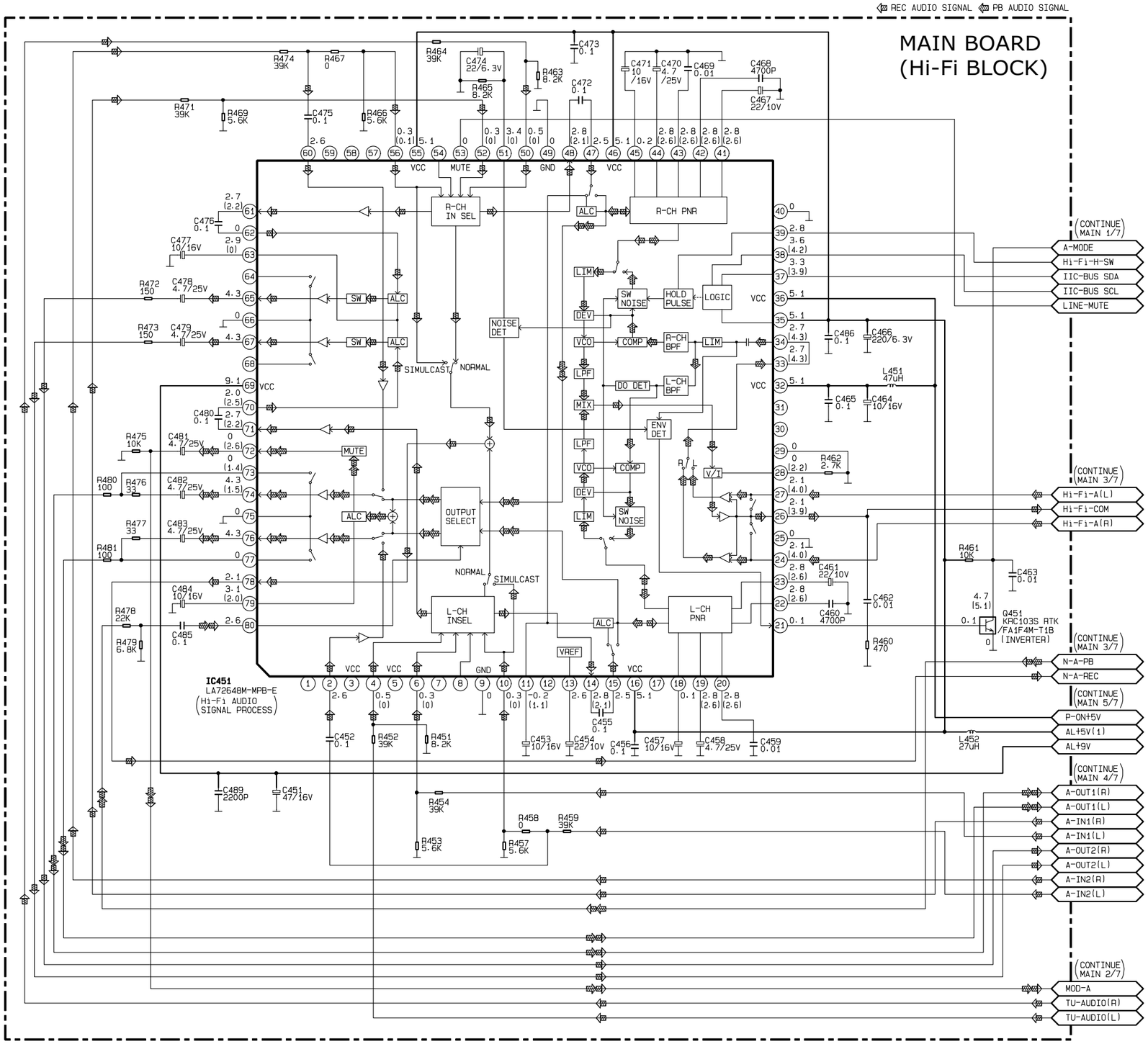
CAUTION!
For continued protection against fire hazard, replace only with the same type fuse.

CAUTION!
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

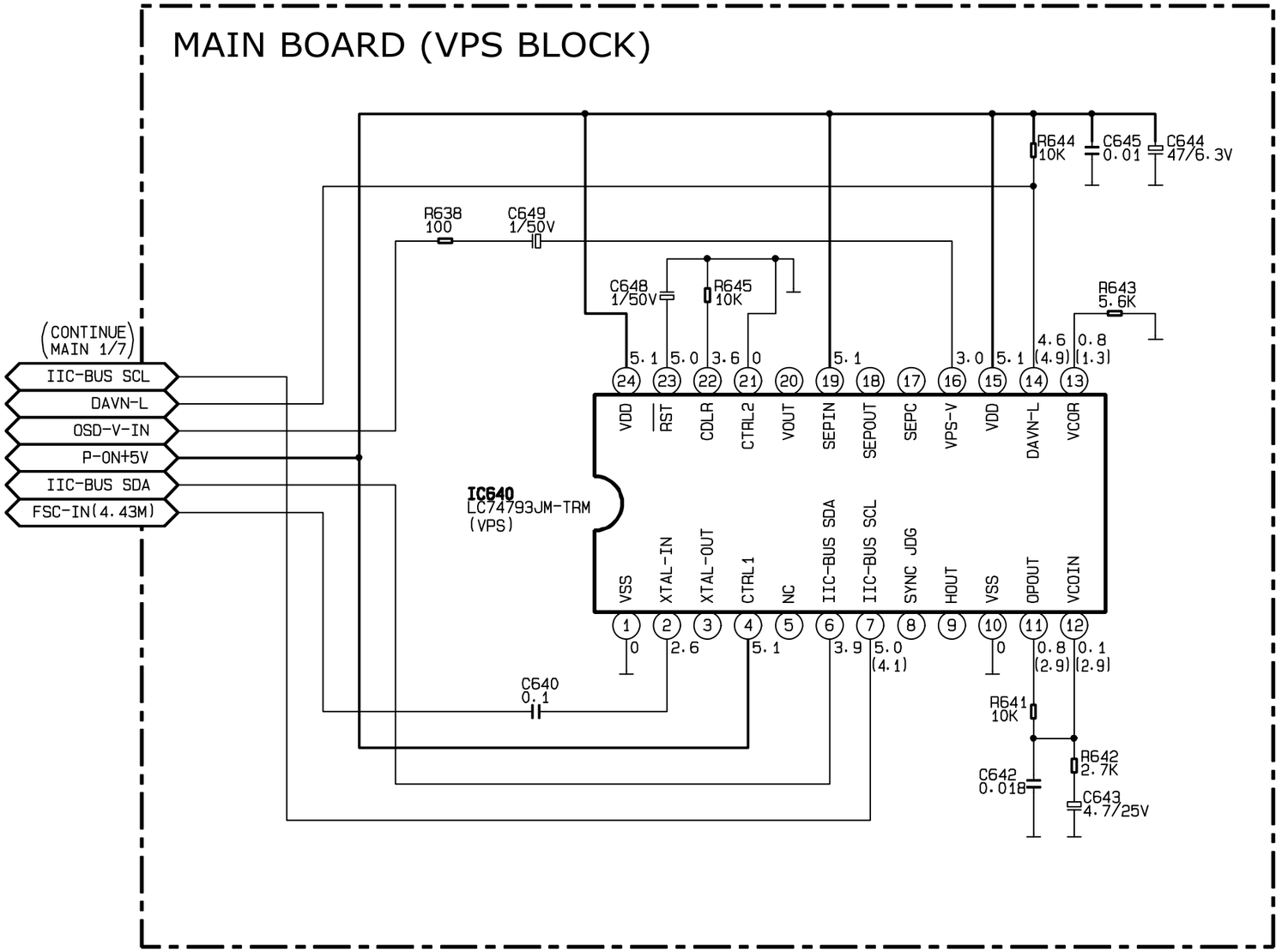


UNLESS OTHERWISE SPECIFIED:
DIODES ARE 1N4148M OR 1SS133(T-77).

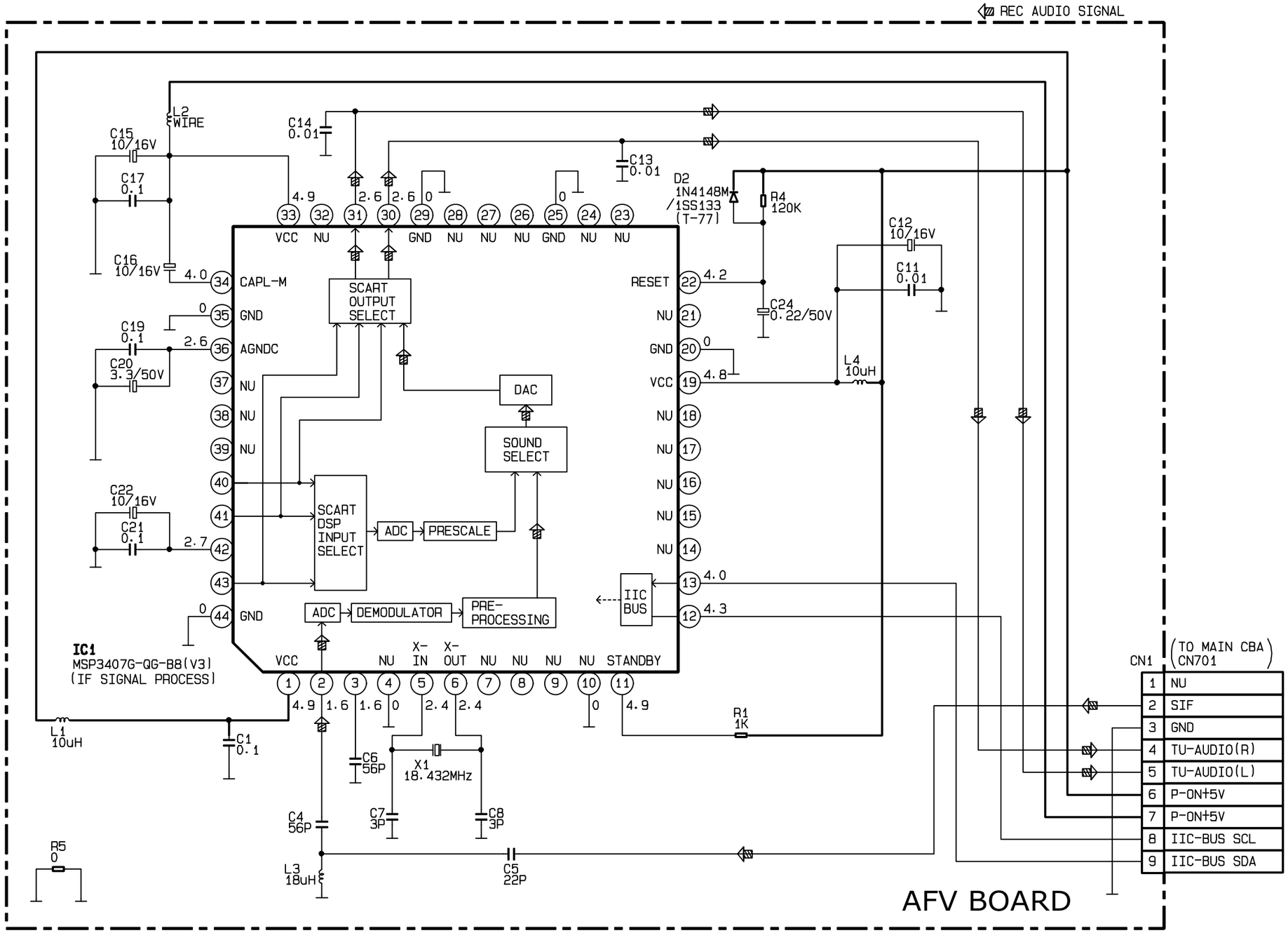
MAIN BOARD (POWER SUPPLY BLOCK)



MAIN BOARD (Hi-Fi BLOCK)



MAIN BOARD (VPS BLOCK)

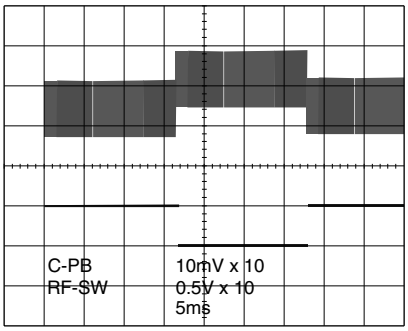

REC AUDIO SIGNAL
L2
WIRE
C15
10/16V
C17
0.1
C16
10/16V
C14
0.01
C13
0.01
D2
1N4148M
/1SS133
(T-77)
R4
120K
C12
10/16V
C11
0.01
C24
0.22/50V
L4
10uH
C19
0.1
C20
3.3/50V
C22
10/16V
C21
0.1
4.9
2.6
2.6
0
0
VCC
NU
GND
NU
NU
NU
GND
NU
NU
CAPL-M
GND
AGNDC
NU
NU
NU
SCART
OUTPUT
SELECT
DAC
SOUND
SELECT
SCART
DSP
INPUT
SELECT
ADC
PRESCALE
ADC
DEMODULATOR
PRE-
PROCESSING
IIC
BUS
RESET
NU
GND
VCC
NU
NU
NU
NU
NU
4.2
4.8
4.0
4.3
IC1
MSP3407G-QG-B8(V3)
(IF SIGNAL PROCESS)
VCC
NU
X-
IN
X-
OUT
NU
NU
NU
NU
STANDBY
4.9
1.6
1.6
0
2.4
2.4
0
4.9
L1
10uH
C1
0.1
C6
56P
X1
18.432MHz
C4
56P
C7
3P
C8
3P
L3
18uH
C5
22P
R1
1K
R5
0
CN1
(TO MAIN CBA
CN701)
1 NU
2 SIF
3 GND
4 TU-AUDIO(R)
5 TU-AUDIO(L)
6 P-ON+5V
7 P-ON+5V
8 IIC-BUS SCL
9 IIC-BUS SDA
AFV BOARD

AFV BOARD

S-11 Waveforms

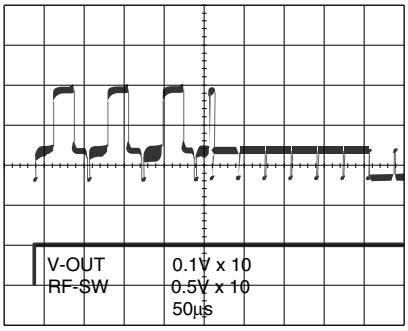
WF2 UPPER TP301

WF1 LOWER TP502

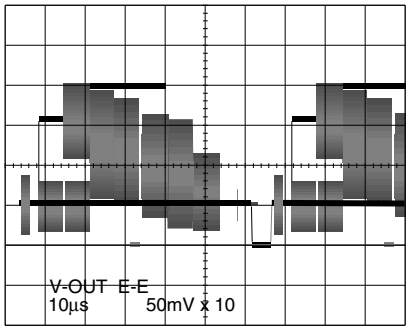


WF3 UPPER J23

WF1 LOWER TP502



WF3 J23



C CIRCUIT BOARD DIAGRAMS

C-1 Main PCB, Sensor PCB Top View

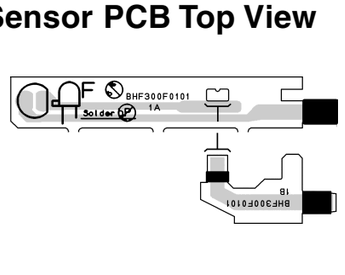
CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

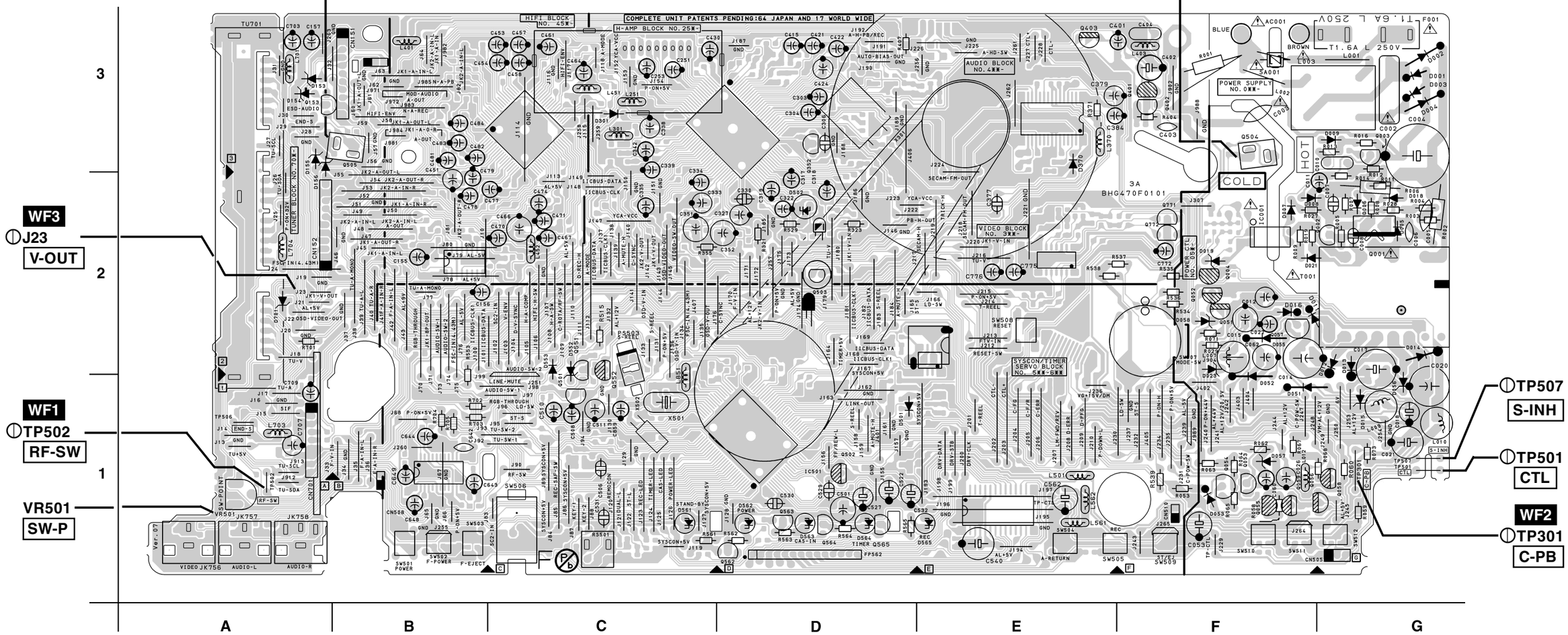
NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED. ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.

Sensor PCB Top View





A B C D E F G

1 2 3

C-1

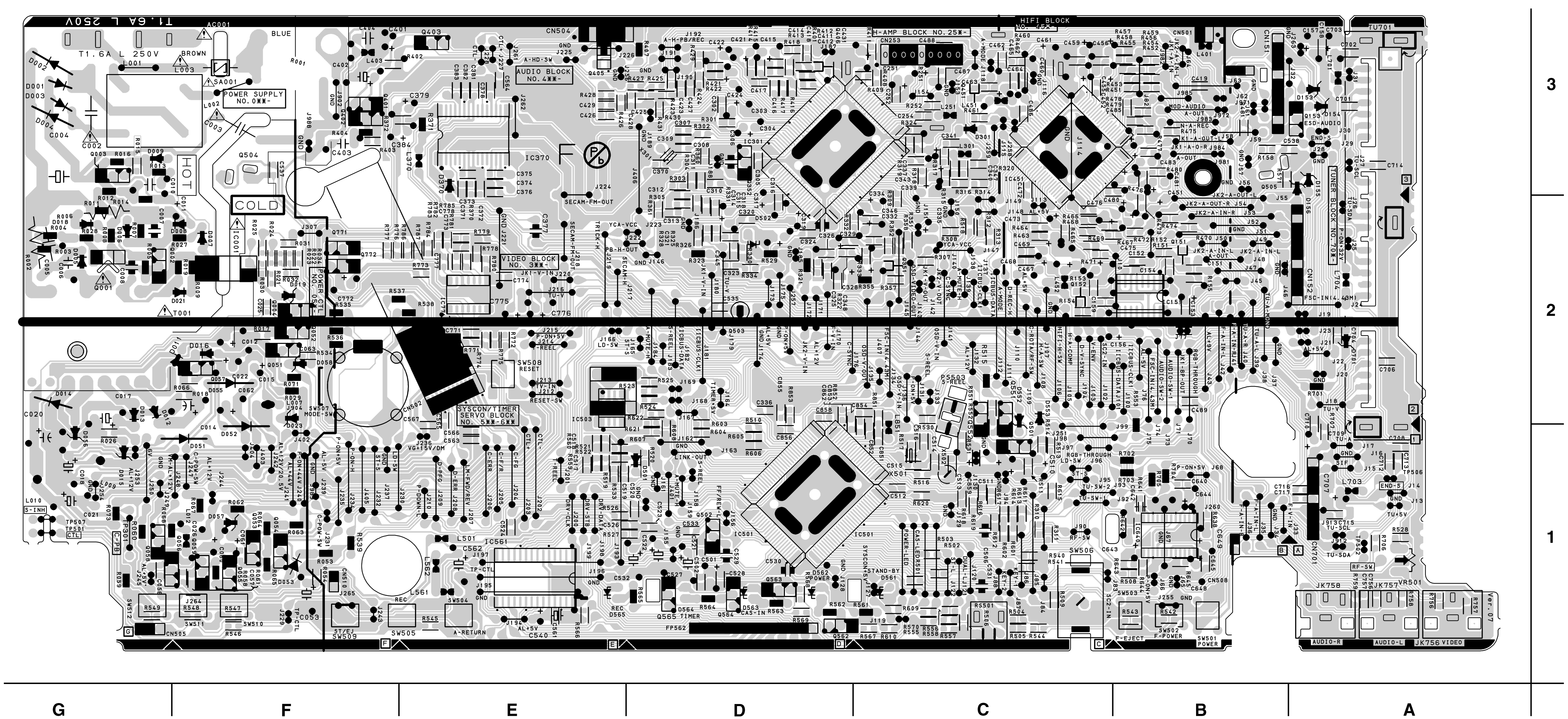
C-2 Main PCB Bottom View

CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

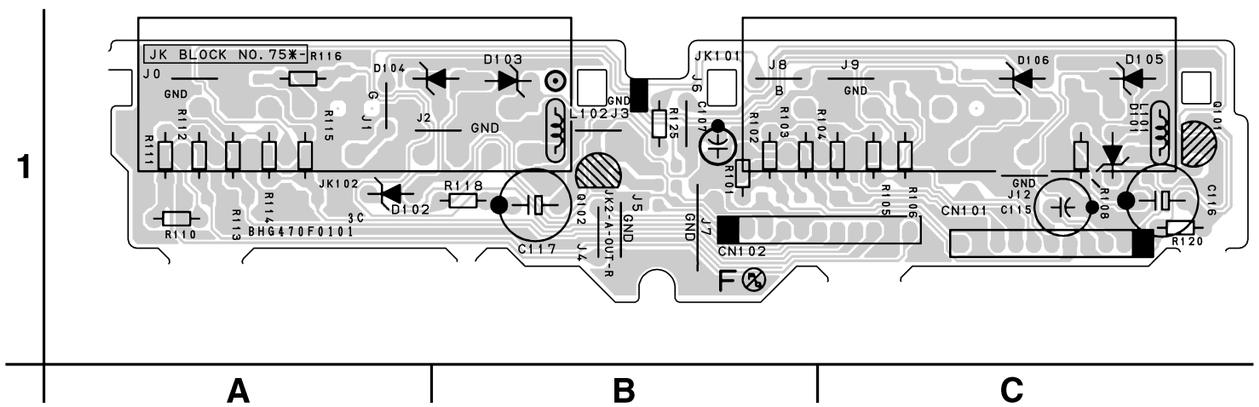
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED. ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.

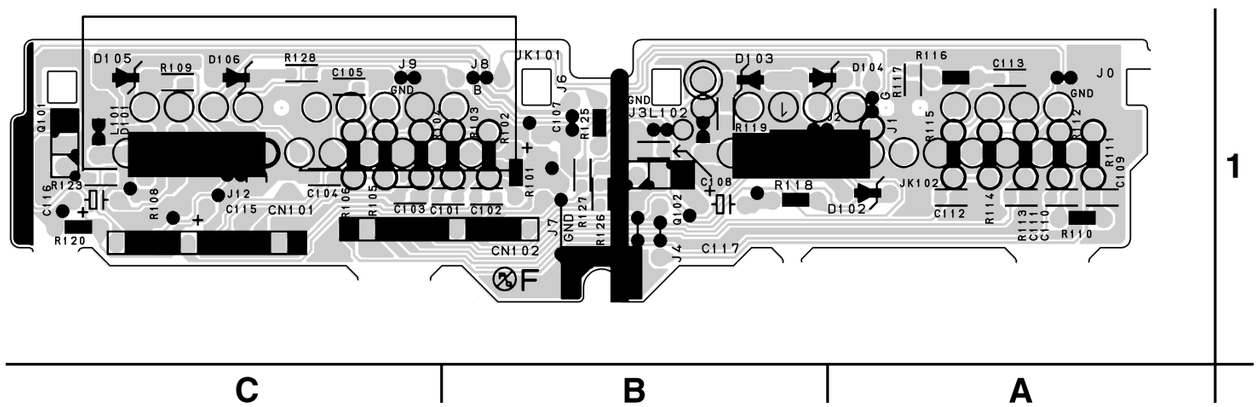


C-3 Jack PCB Top View / Bottom View

Jack PCB Top View

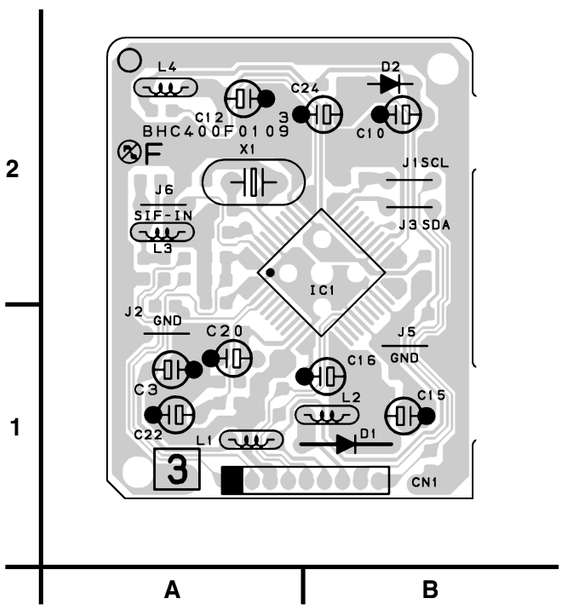


Jack PCB Bottom View

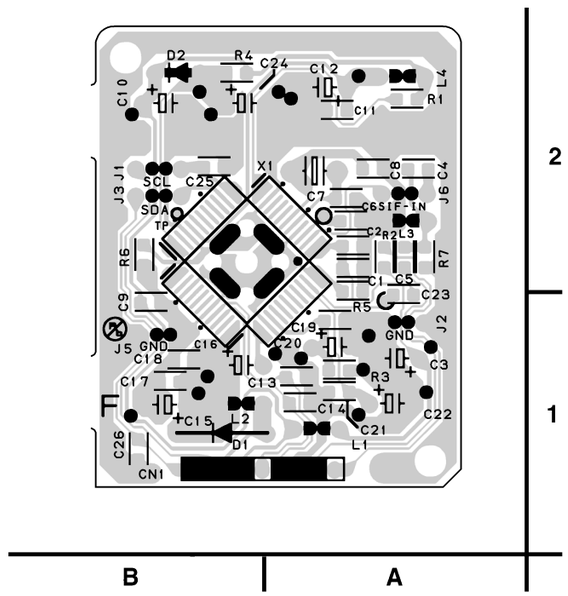


C-4 AFV PCB Top View / Bottom View, Sub Jack PCB Top View / Bottom View (VT-FX440E(UK))

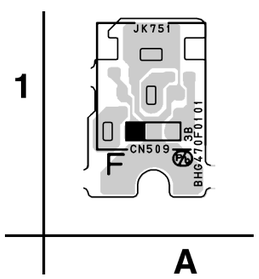
AFV PCB Top View



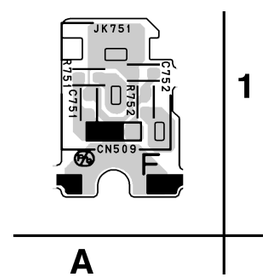
AFV PCB Bottom View



Sub Jack PCB Top View

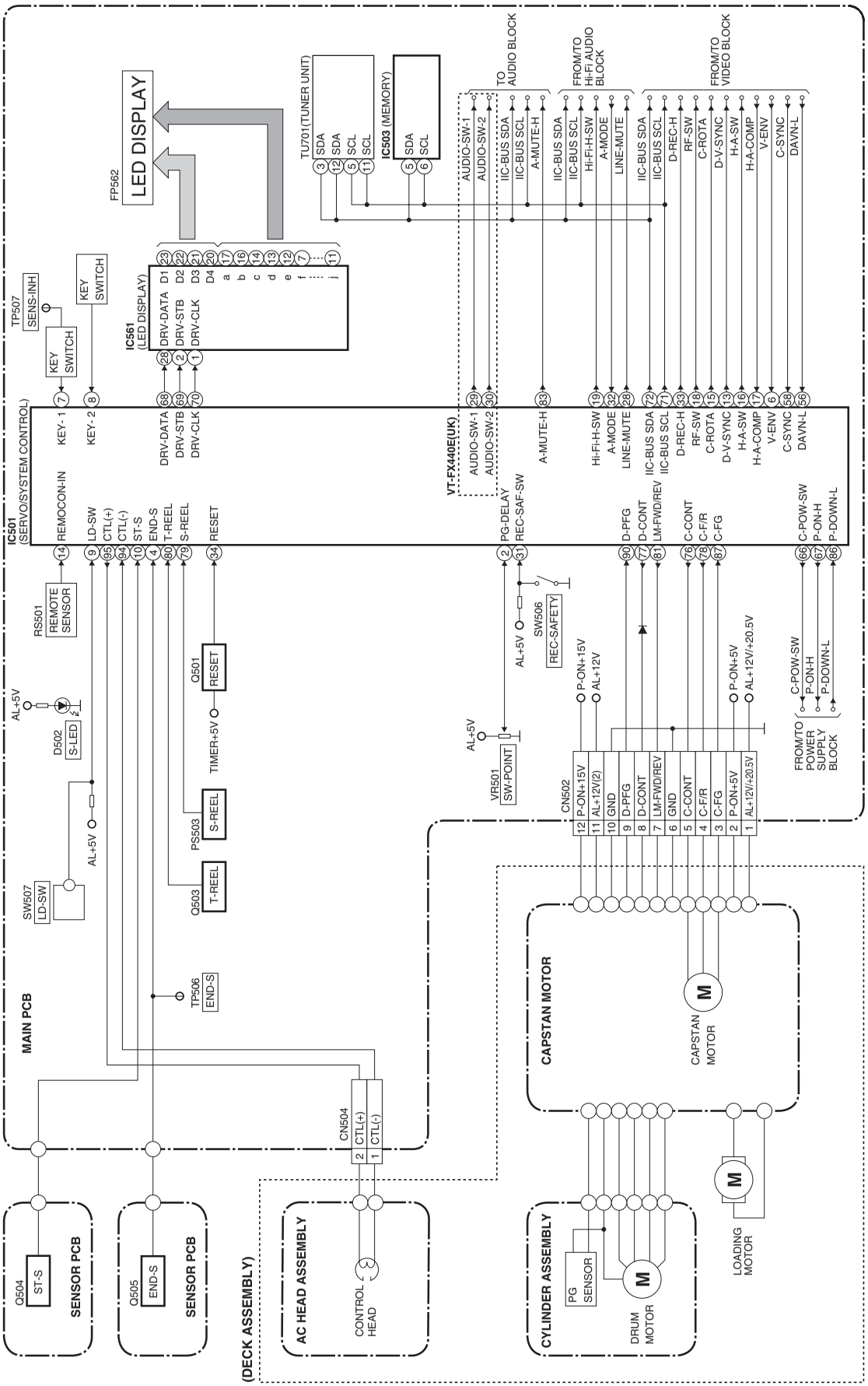


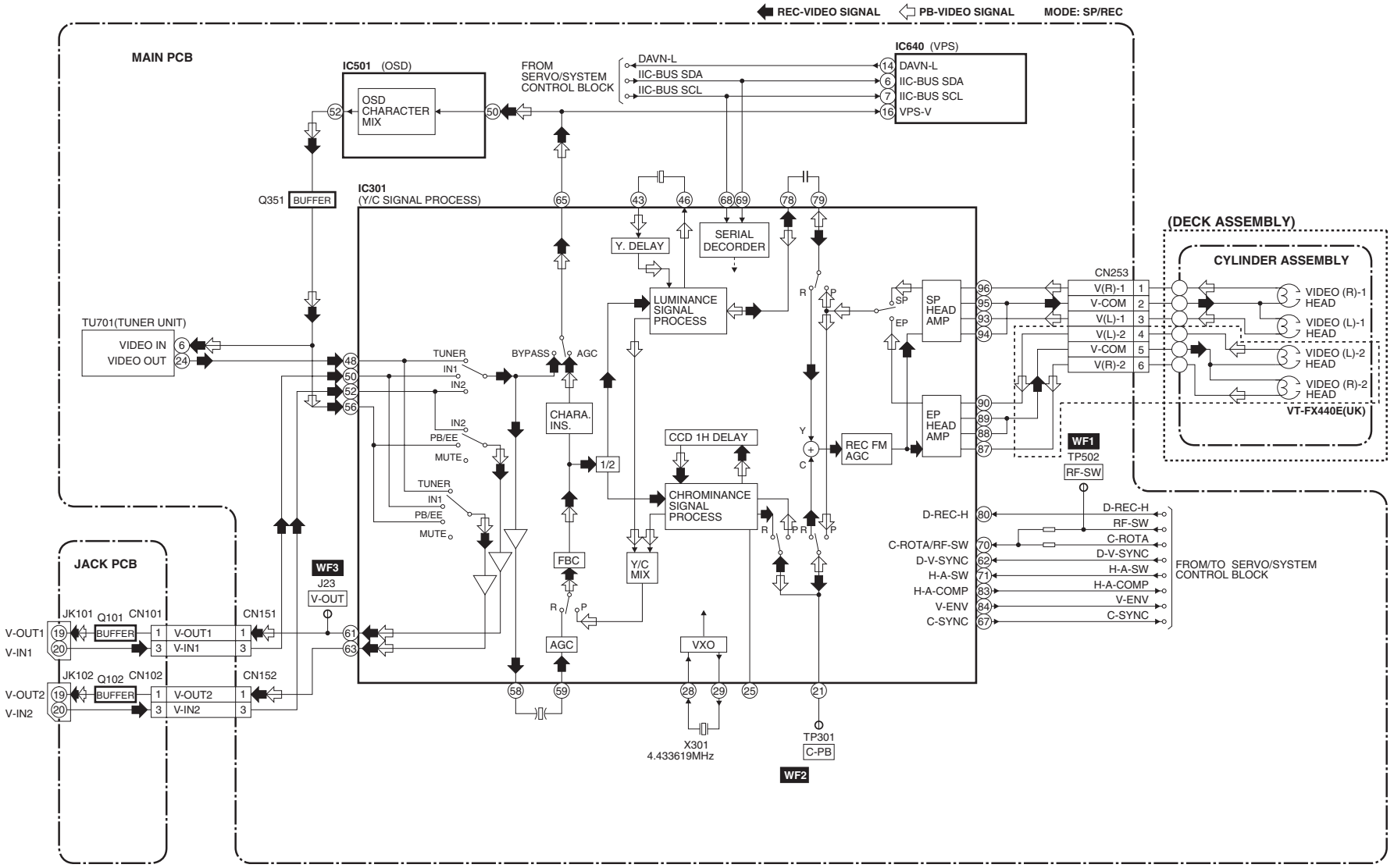
Sub Jack PCB Bottom View

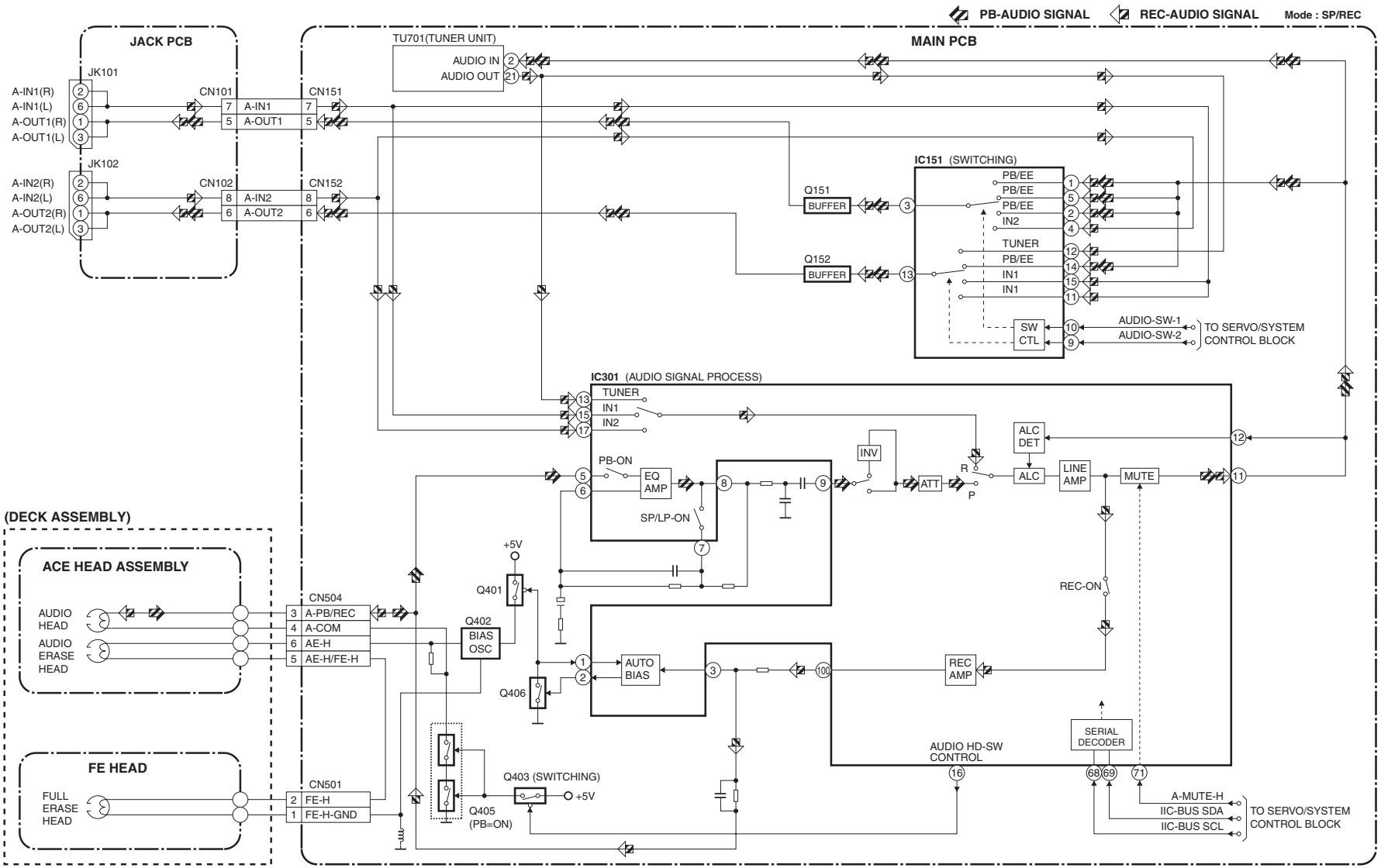


B BLOCK DIAGRAMS

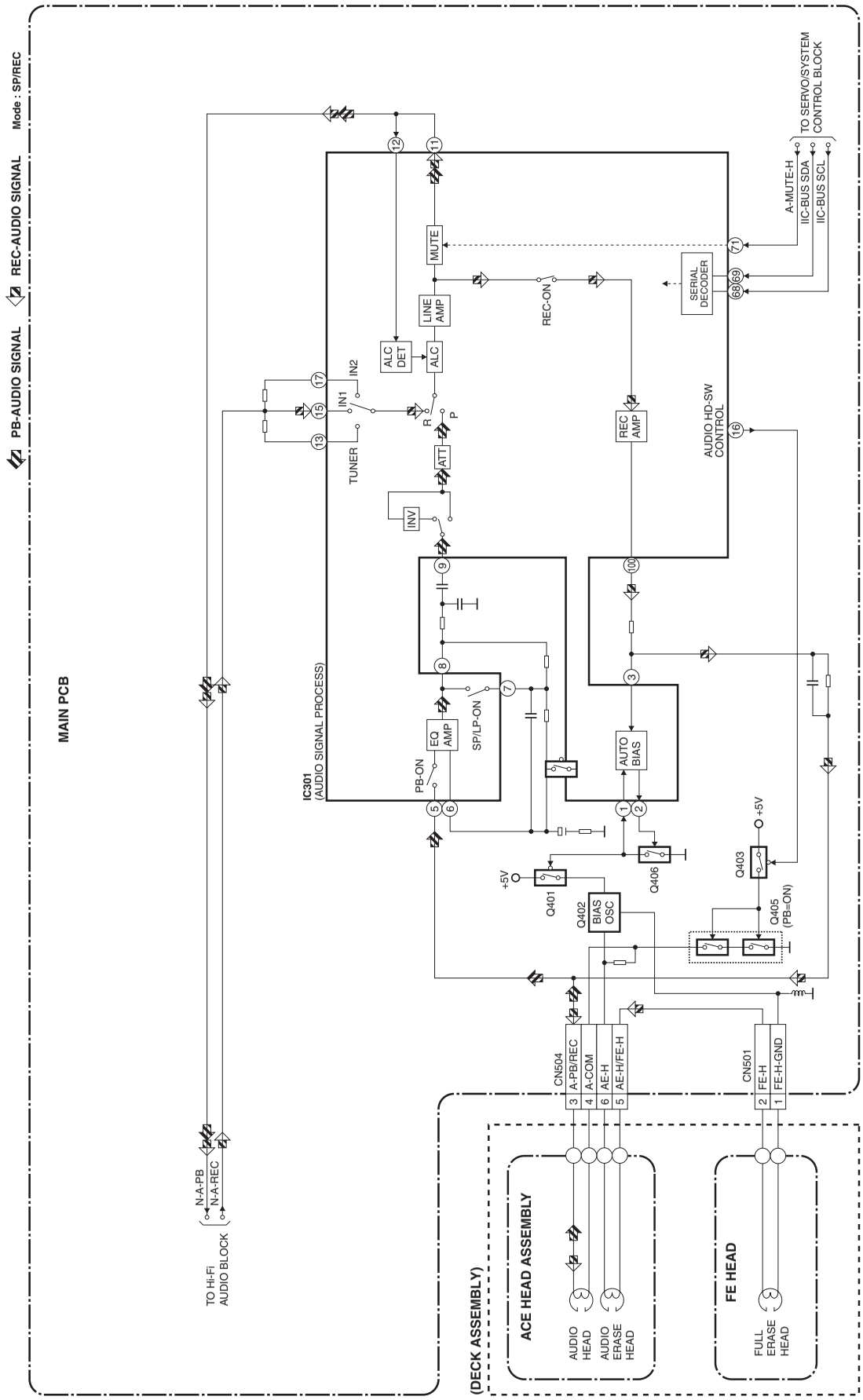
B-1 Servo / System Control Block Diagram



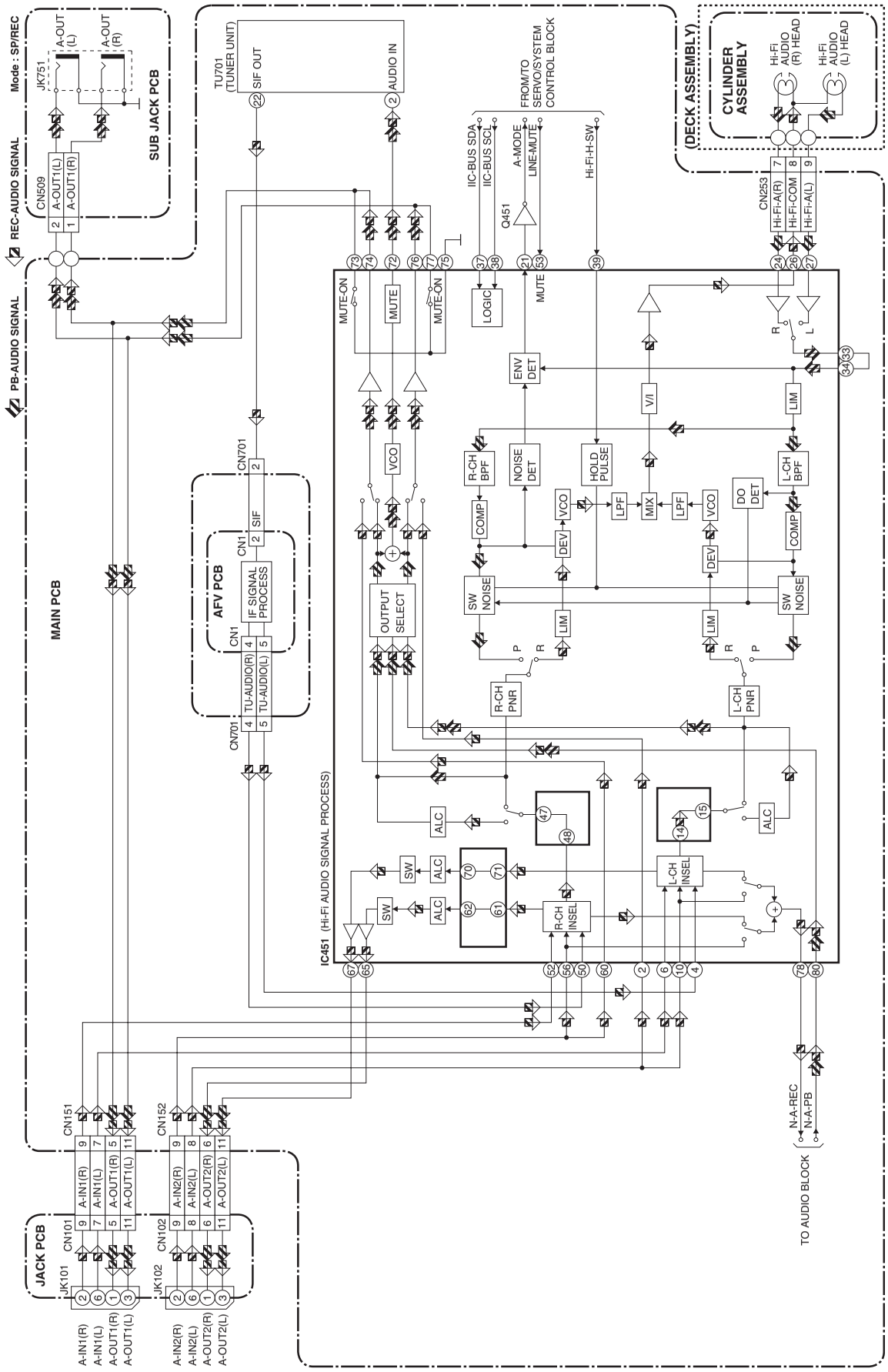

REC-VIDEO SIGNAL
PB-VIDEO SIGNAL
MODE: SP/REC
MAIN PCB
IC501 (OSD)
OSD CHARACTER MIX
FROM SERVO/SYSTEM CONTROL BLOCK
DAVN-L
IIC-BUS SDA
IIC-BUS SCL
IC640 (VPS)
VPS-V
Q351 BUFFER
IC301 (Y/C SIGNAL PROCESS)
Y. DELAY
SERIAL DECORDER
LUMINANCE SIGNAL PROCESS
CHROMINANCE SIGNAL PROCESS
CCD 1H DELAY
CHARA. INS.
FBC
Y/C MIX
AGC
VXO
X301
4.433619MHz
REC FM AGC
SP HEAD AMP
EP HEAD AMP
(DECK ASSEMBLY)
CYLINDER ASSEMBLY
CN253
V(R)-1
V-COM
V(L)-1
V(L)-2
V(R)-2
VIDEO (R)-1 HEAD
VIDEO (L)-1 HEAD
VIDEO (L)-2 HEAD
VIDEO (R)-2 HEAD
VT-FX440E(UK)
TU701(TUNER UNIT)
VIDEO IN
VIDEO OUT
TUNER
IN1
IN2
PB/EE
MUTE
BYPASS
AGC
1/2
WF1
TP502
RF-SW
WF2
TP301
C-PB
WF3
J23
V-OUT
JACK PCB
JK101
Q101
CN101
CN151
JK102
Q102
CN102
CN152
V-OUT1
V-IN1
V-OUT2
V-IN2
BUFFER
D-REC-H
C-ROTA/RF-SW
D-V-SYNC
H-A-SW
H-A-COMP
V-ENV
C-SYNC
FROM/TO SERVO/SYSTEM CONTROL BLOCK


PB-AUDIO SIGNAL
REC-AUDIO SIGNAL
Mode : SP/REC
JACK PCB
JK101
A-IN1(R)
A-IN1(L)
A-OUT1(R)
A-OUT1(L)
JK102
A-IN2(R)
A-IN2(L)
A-OUT2(R)
A-OUT2(L)
CN101
CN102
CN151
CN152
A-IN1
A-OUT1
A-IN2
A-OUT2
TU701(TUNER UNIT)
AUDIO IN
AUDIO OUT
MAIN PCB
IC151 (SWITCHING)
Q151
Q152
BUFFER
PB/EE
IN2
TUNER
IN1
SW CTL
AUDIO-SW-1
AUDIO-SW-2
TO SERVO/SYSTEM CONTROL BLOCK
IC301 (AUDIO SIGNAL PROCESS)
PB-ON
EQ AMP
SP/LP-ON
INV
ATT
ALC DET
ALC
LINE AMP
MUTE
REC-ON
REC AMP
AUTO BIAS
BIAS OSC
Q401
Q402
Q403 (SWITCHING)
Q405 (PB=ON)
Q406
+5V
AUDIO HD-SW CONTROL
SERIAL DECODER
A-MUTE-H
IIC-BUS SDA
IIC-BUS SCL
TO SERVO/SYSTEM CONTROL BLOCK
(DECK ASSEMBLY)
ACE HEAD ASSEMBLY
AUDIO HEAD
AUDIO ERASE HEAD
CN504
A-PB/REC
A-COM
AE-H
AE-H/FE-H
FE HEAD
FULL ERASE HEAD
CN501
FE-H
FE-H-GND

B-4 Audio Block Diagram (VT-FX440E(UK))



B-5 Hi-Fi Audio Block Diagram (VT-FX440E(UK))

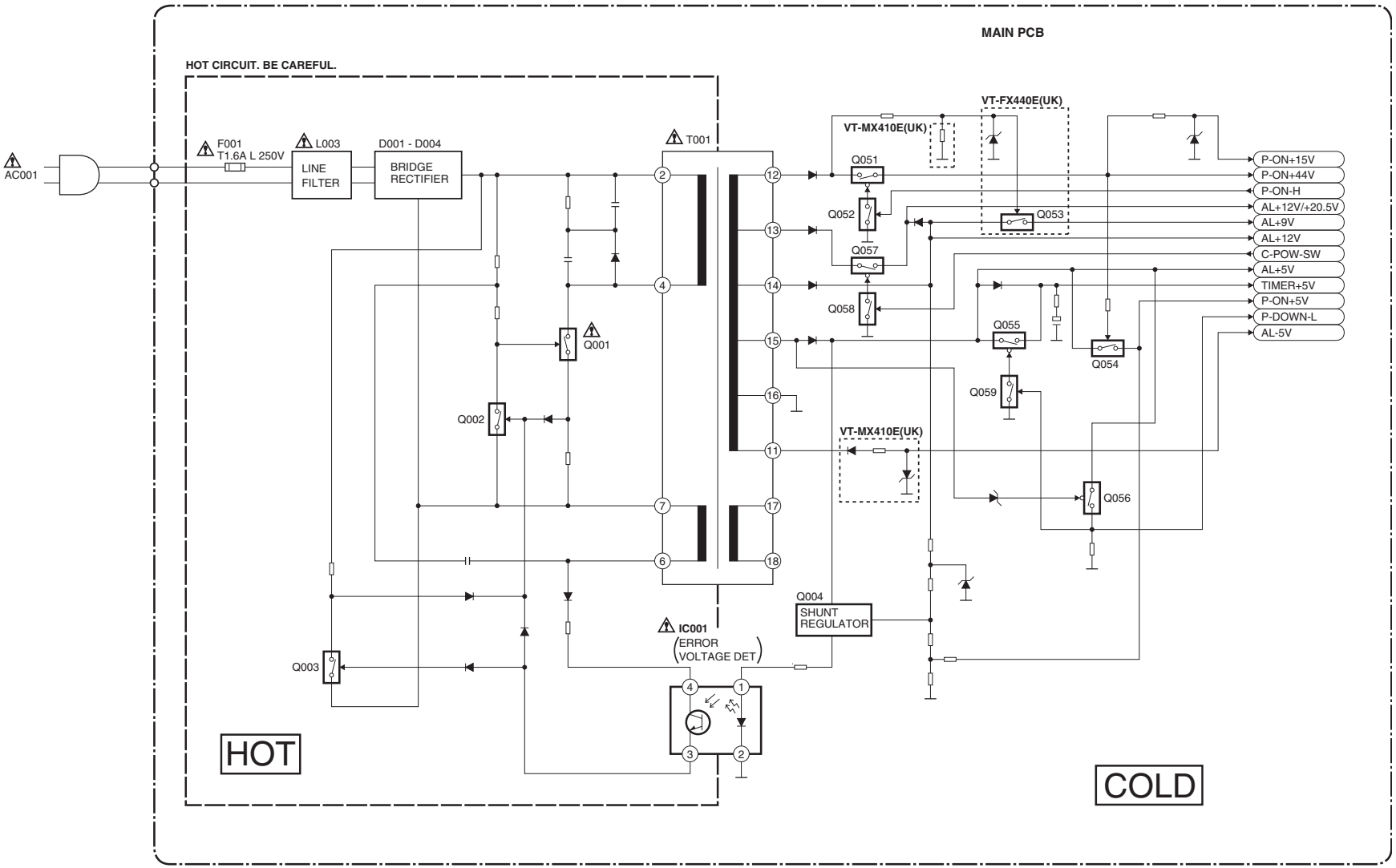


B-6 Power Supply Block Diagram

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE T1.6AL/250V FUSE.

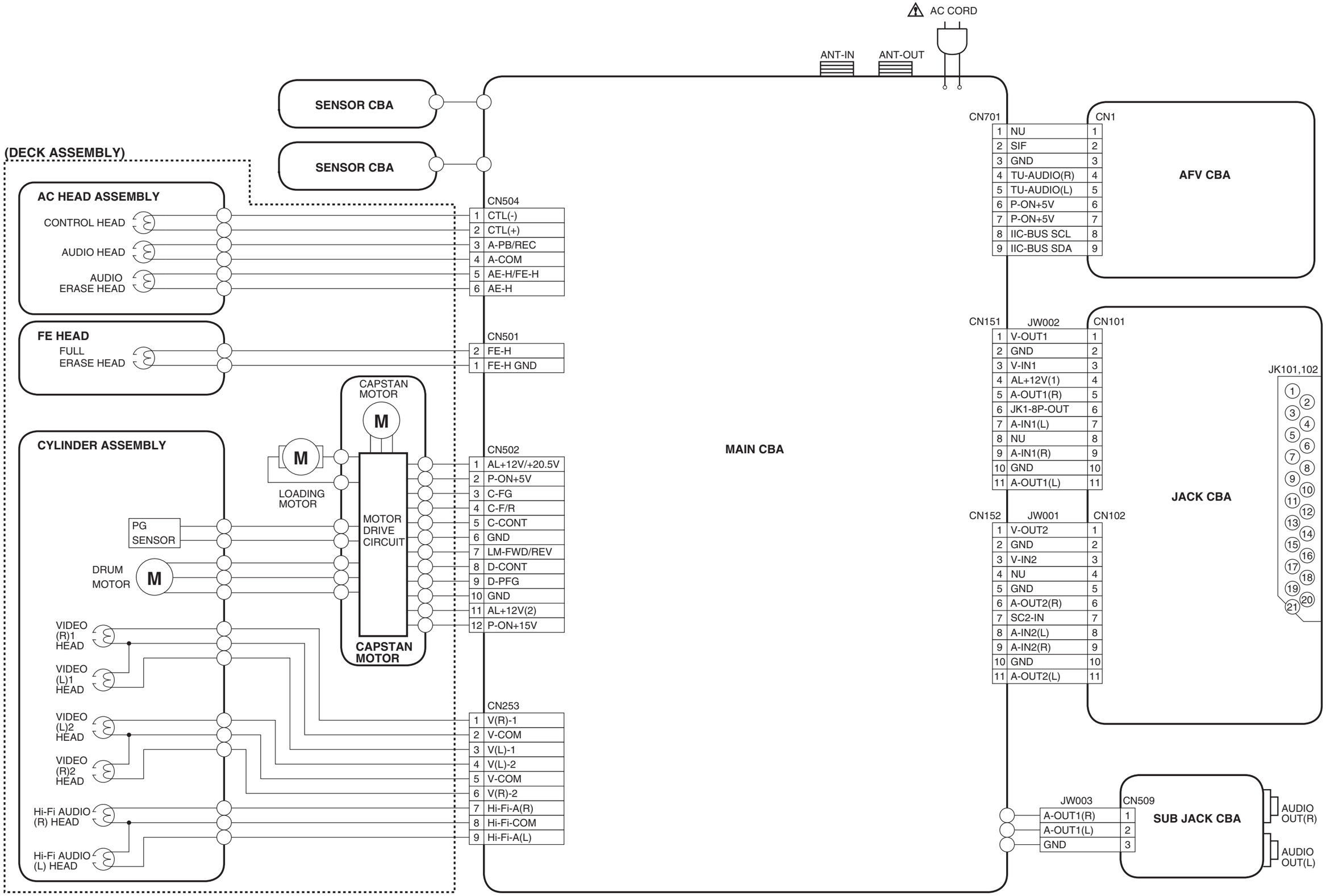
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.



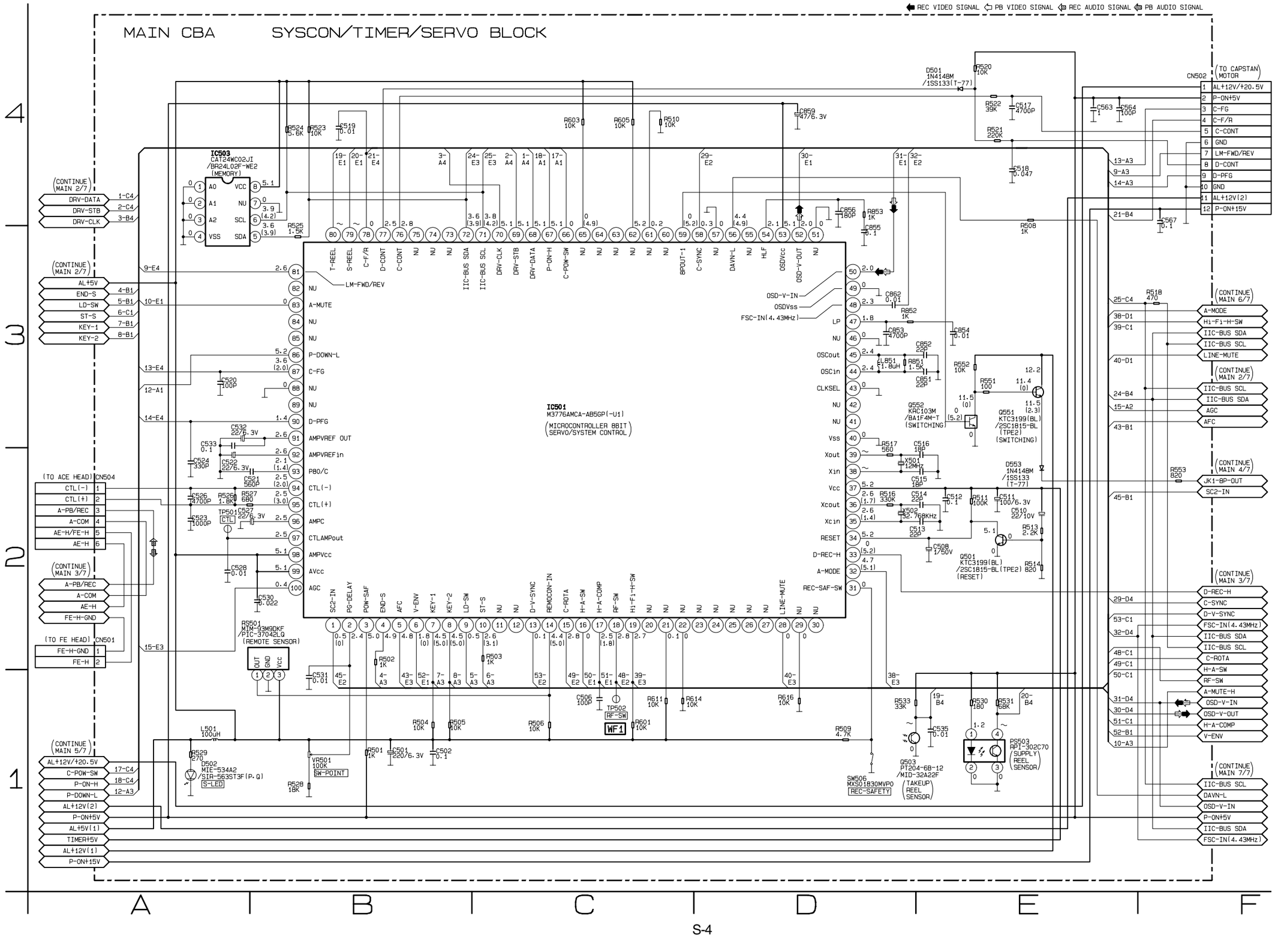
Block / Schematic / PCB Diagrams

VT-FX540E(UK)

S-2 Wiring Diagrams - VT-FX540E(UK)



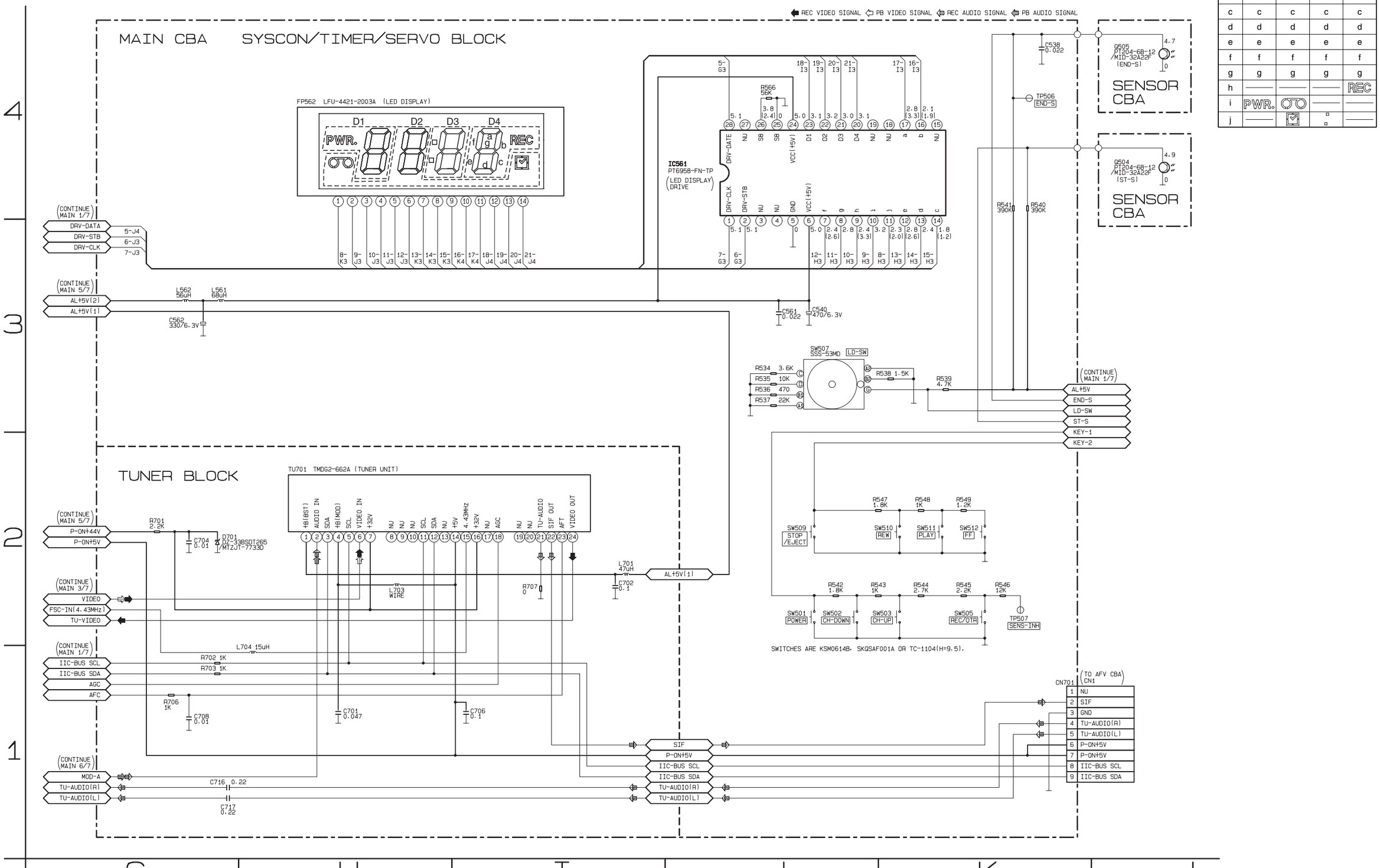
S-3 Main 1/7 Schematic Diagram - VT-FX540E(UK)



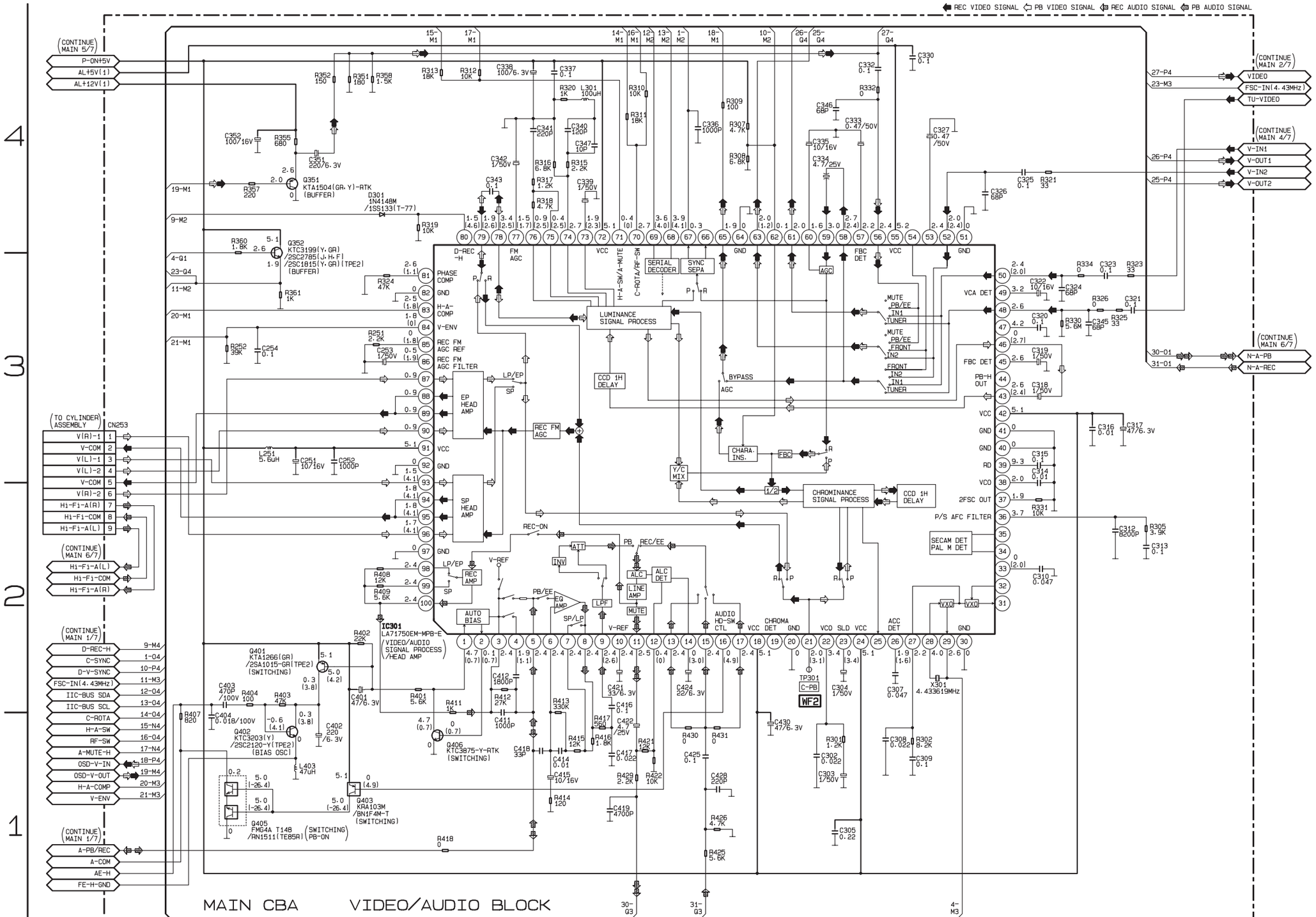
S-4 Main 2/7, Sensor Schematic Diagram - VT-FX540E(UK)

FP562 MATRIX CHART

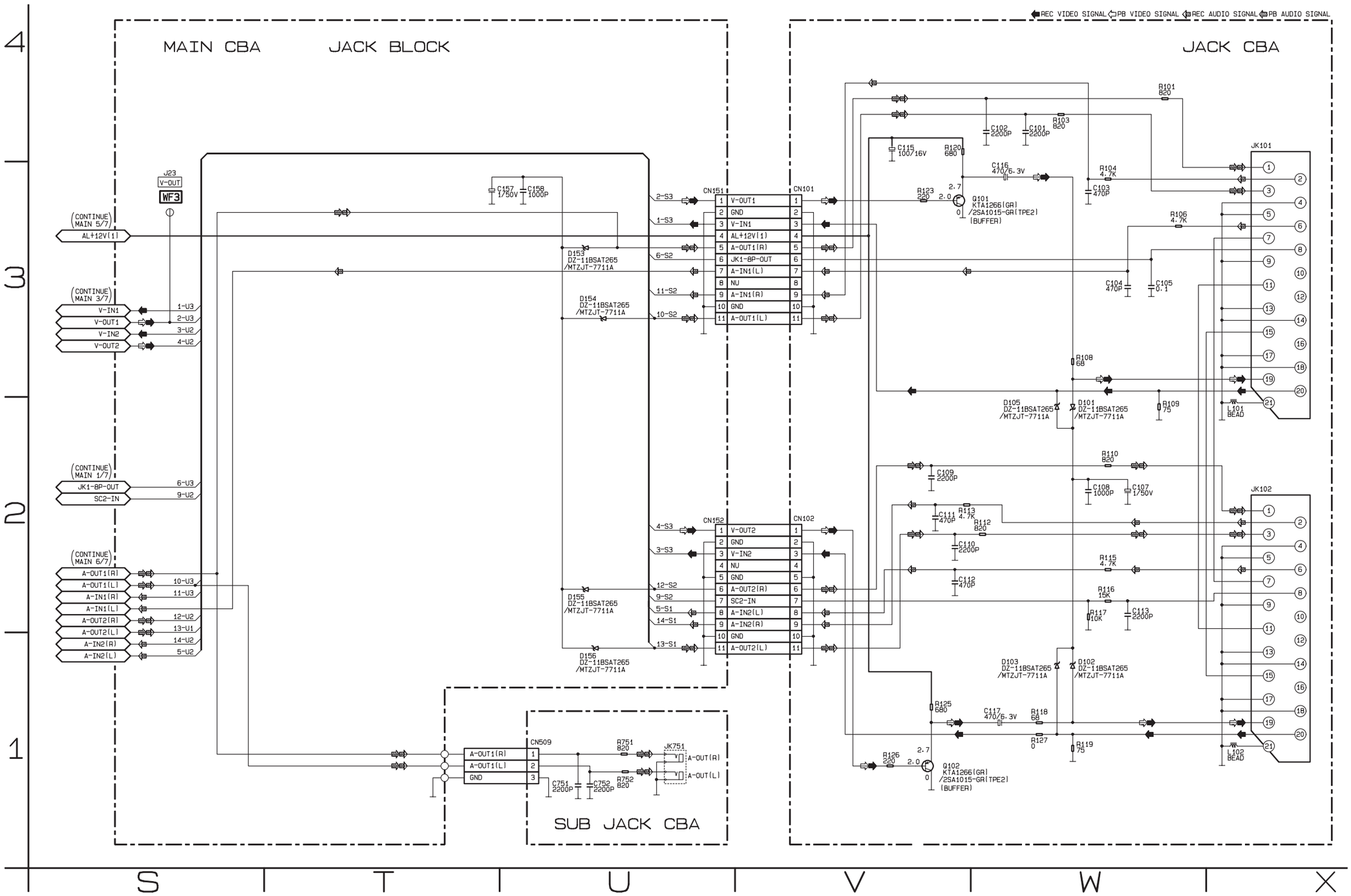
	D1	D2	D3	D4
a	a	a	a	a
b	b	b	b	b
c	c	c	c	c
d	d	d	d	d
e	e	e	e	e
f	f	f	f	f
g	g	g	g	g
h	——	——	——	REC
i	PWR.	⏲	——	——
j	——	☑	□	——



S-5 Main 3/7 Schematic Diagram - VT-FX540E(UK)



S-6 Main 4/7, Jack, Sub Jack Schematic Diagram - VT-FX540E(UK)

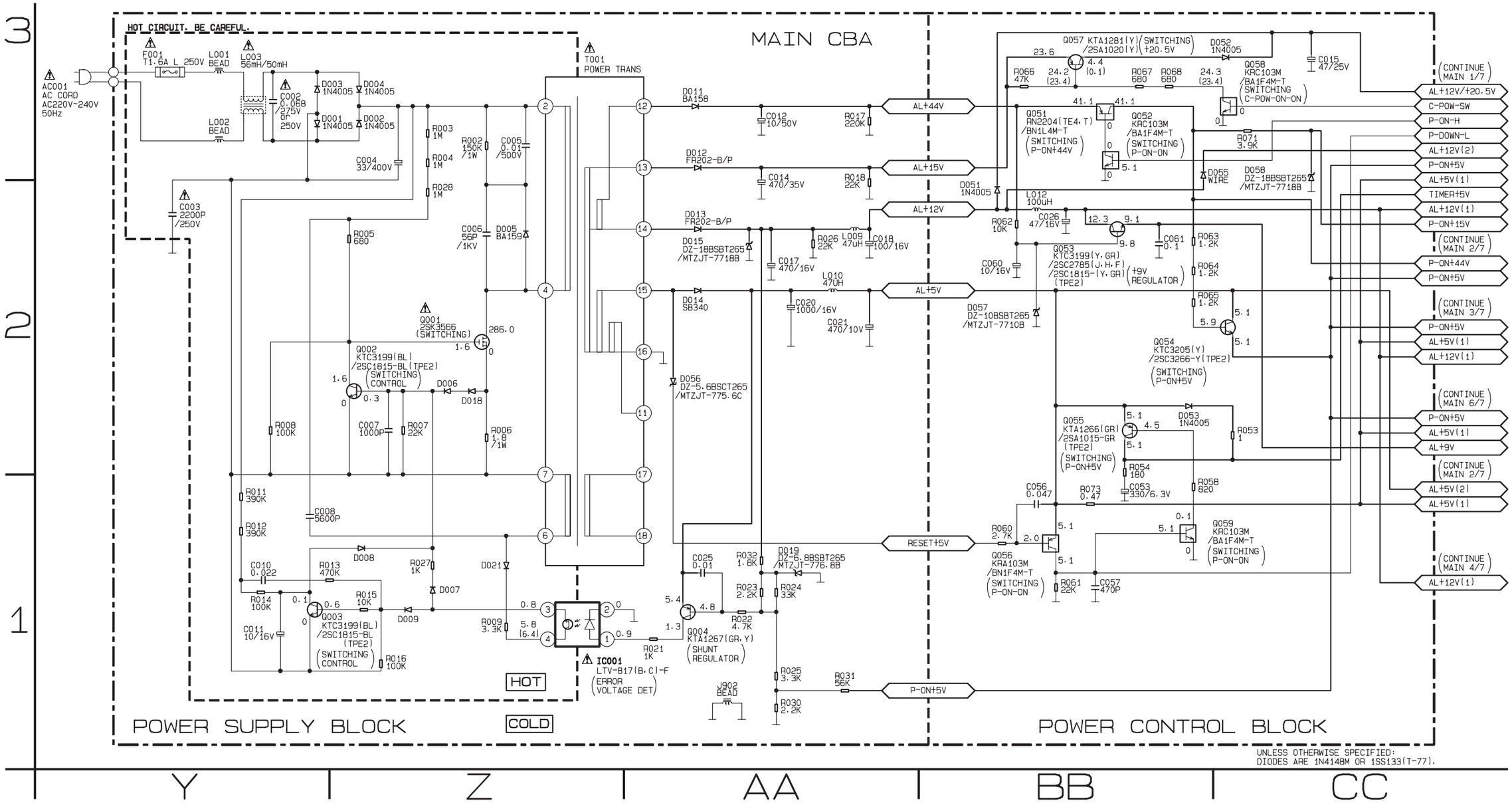


S-7 Main 5/7 Schematic Diagram - VT-FX540E(UK)

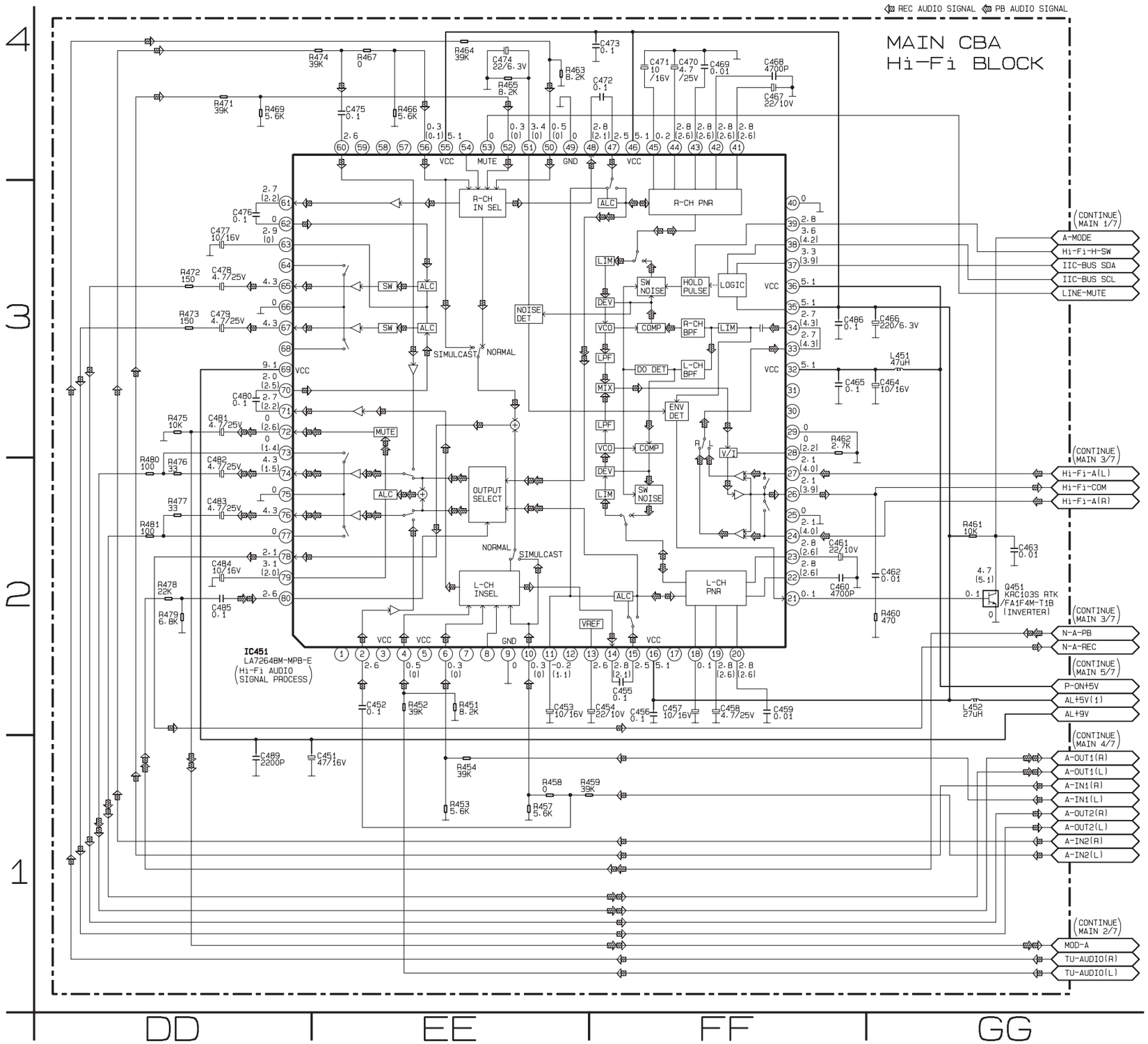
CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

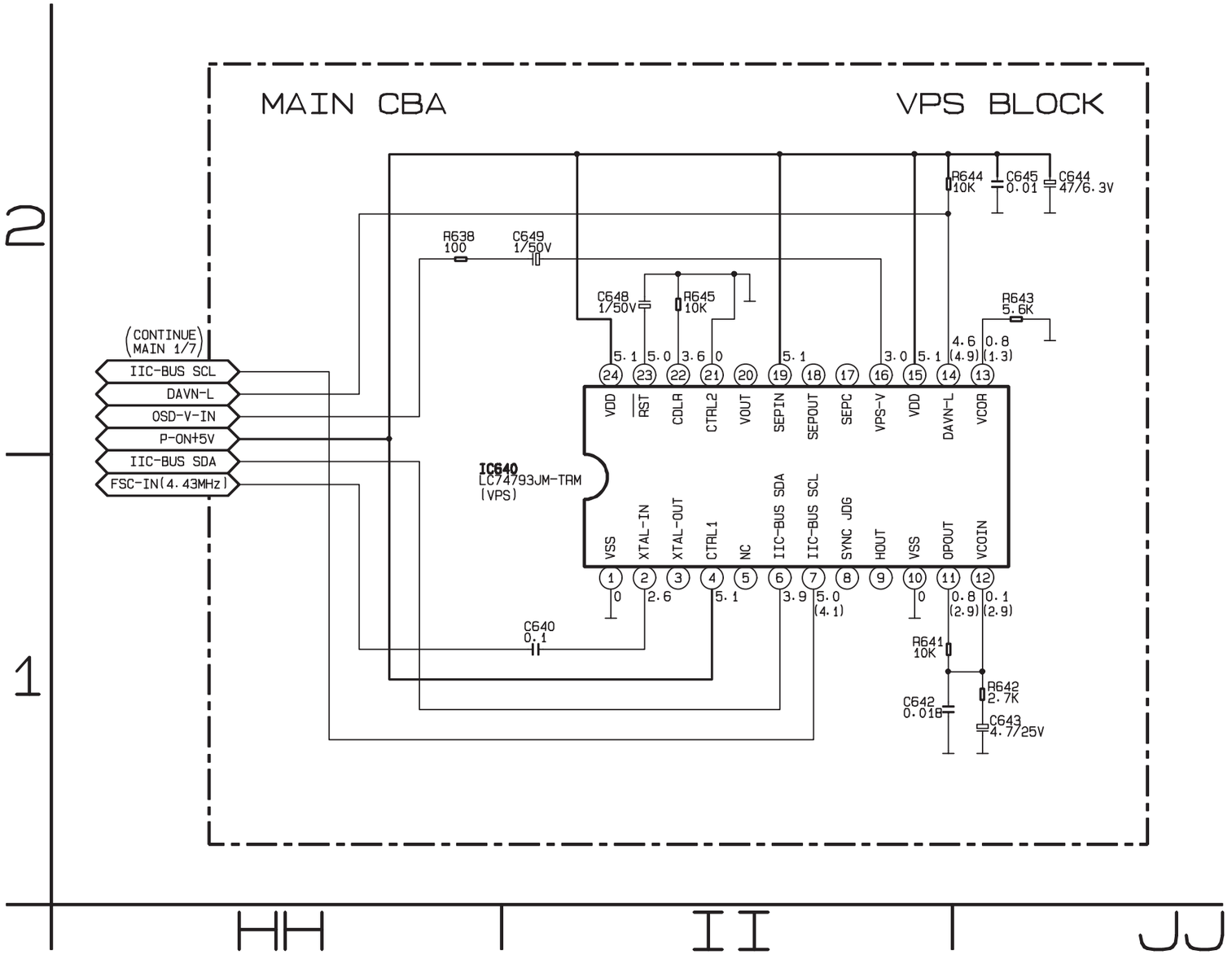
CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.



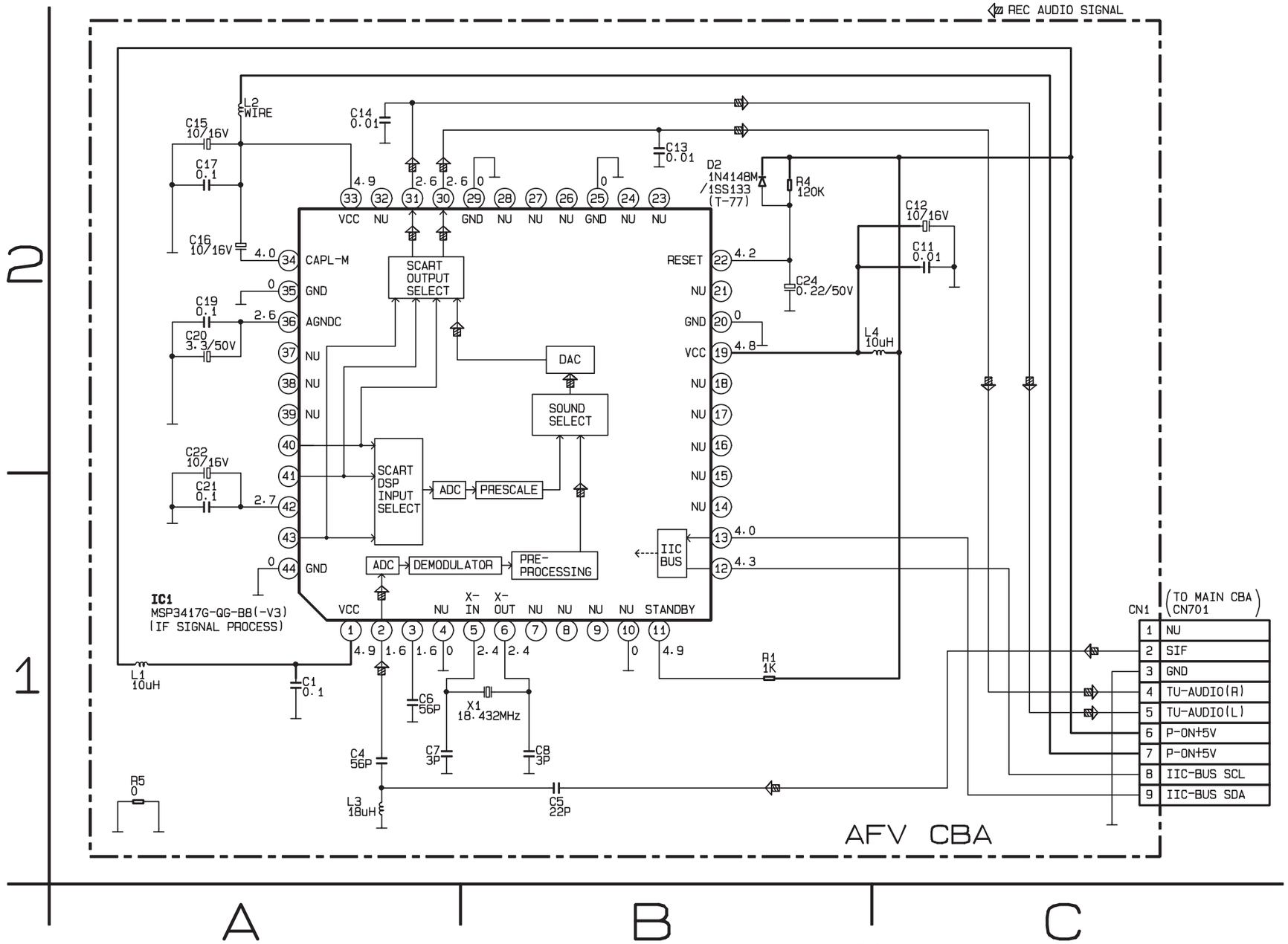
S-8 Main 6/7 Schematic Diagram - VT-FX540E(UK)



S-9 Main 7/7 Schematic Diagram - VT-FX540E(UK)



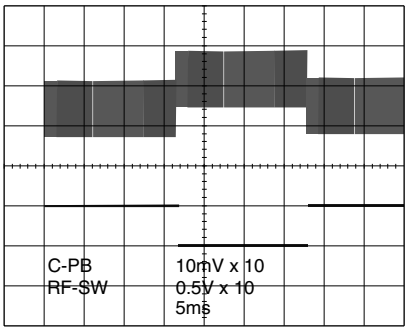
S-10 AFV Schematic Diagram - VT-FX540E(UK)



S-11 Waveforms - VT-FX540E(UK)

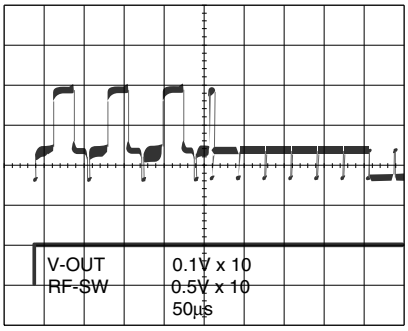
WF2 UPPER TP301

WF1 LOWER TP502

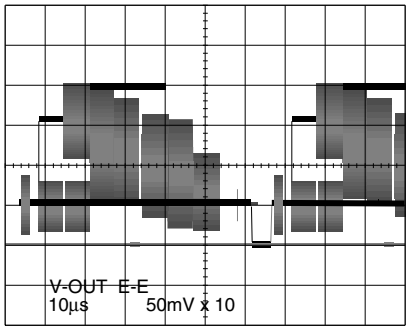


WF3 UPPER J23

WF1 LOWER TP502



WF3 J23



C CIRCUIT BOARD DIAGRAMS - VT-FX540E(UK)

C-1 Main CBA, Sensor CBA Top View

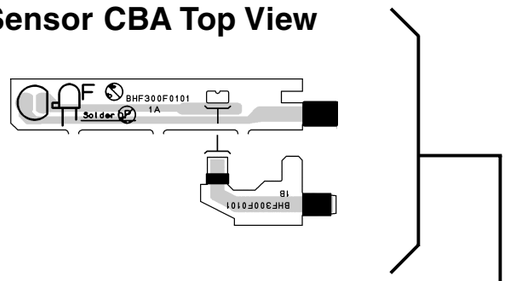
CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

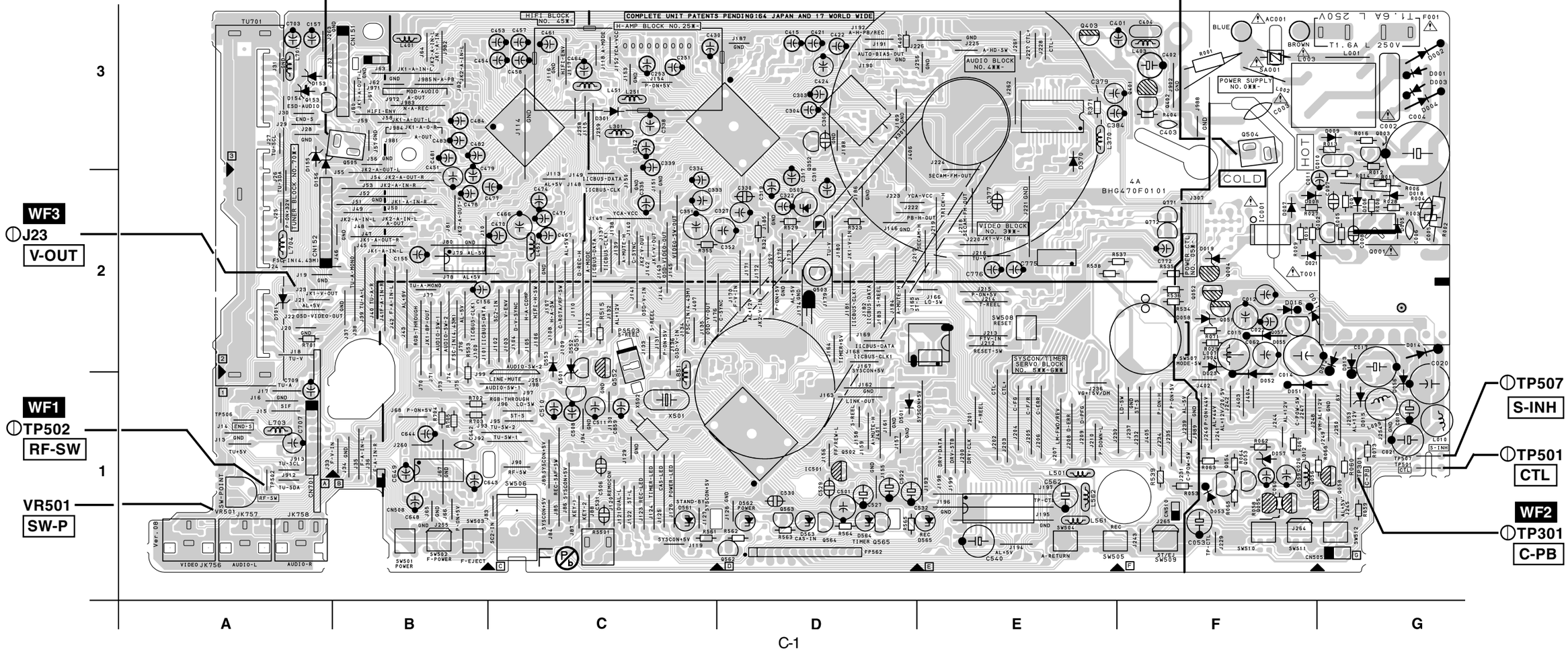
NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED. ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.

Sensor CBA Top View





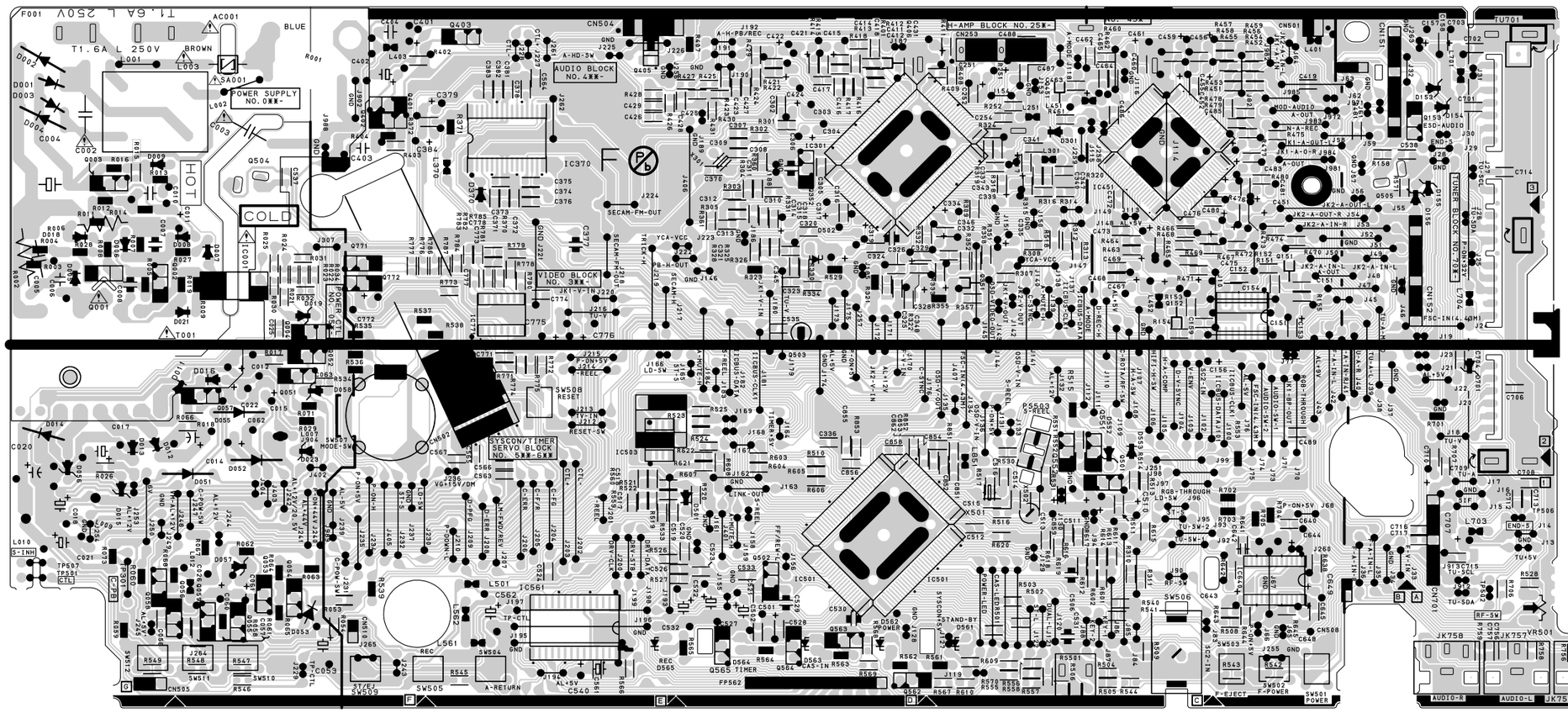
C-2 Main CBA Bottom View - VT-FX540E(UK)

CAUTION !
For continued protection against fire hazard, replace only with the same type fuse.

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION !
Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED. ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.

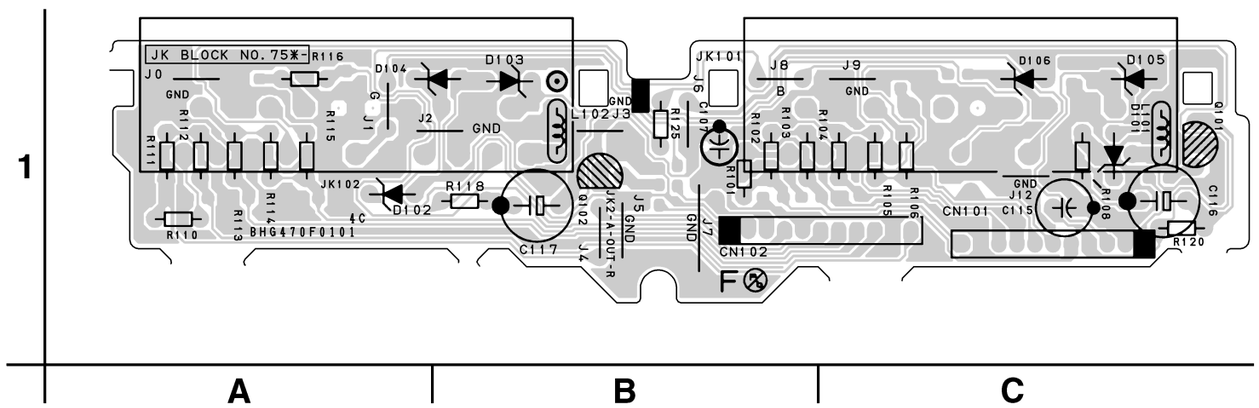


G F E D C B A

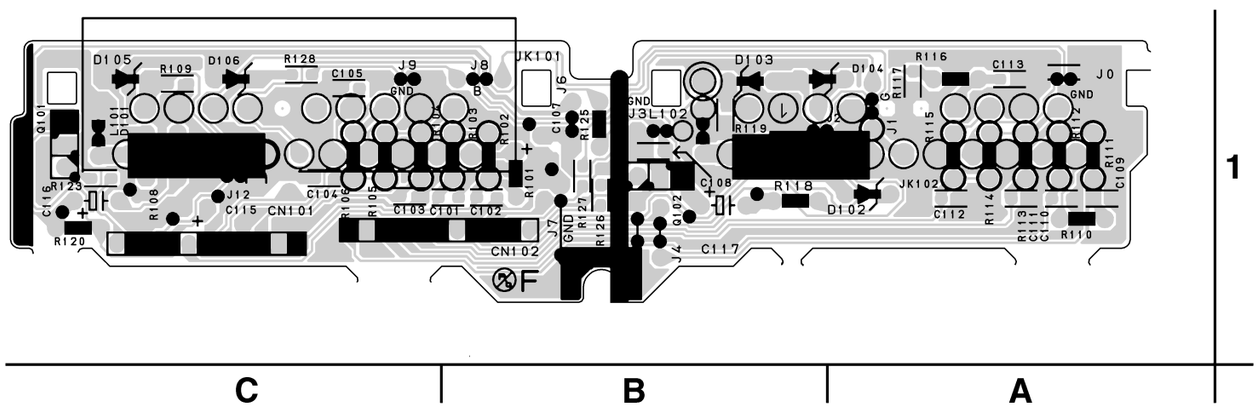
C-2

C-3 Jack CBA Top View / Bottom View - VT-FX540E(UK)

Jack CBA Top View

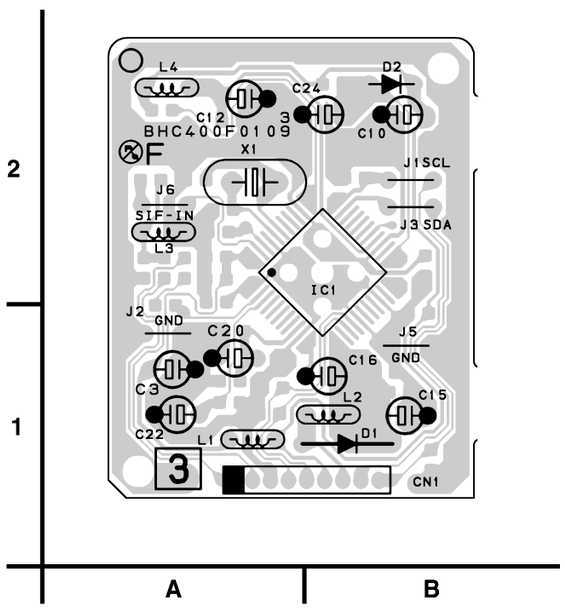


Jack CBA Bottom View

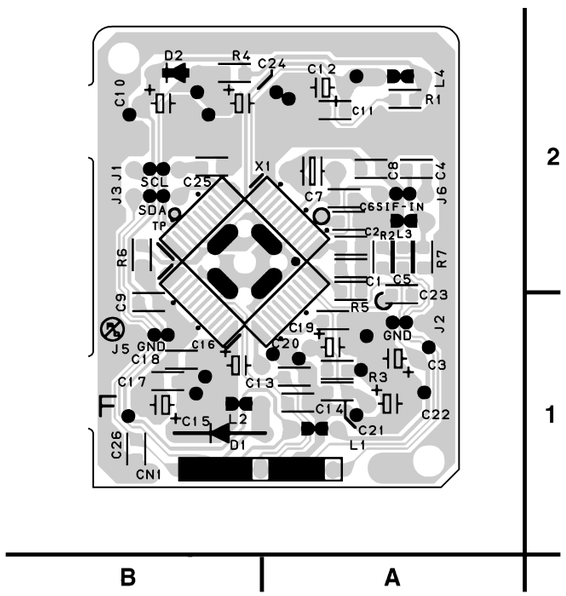


C-4 AFV CBA Top View / Bottom View, Sub Jack CBA Top View / Bottom View - VT-FX540E(UK)

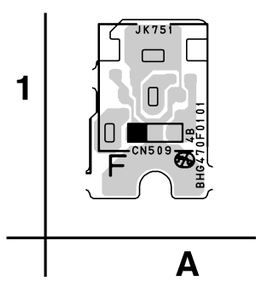
AFV CBA Top View



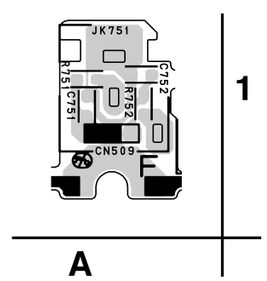
AFV CBA Bottom View



Sub Jack CBA Top View

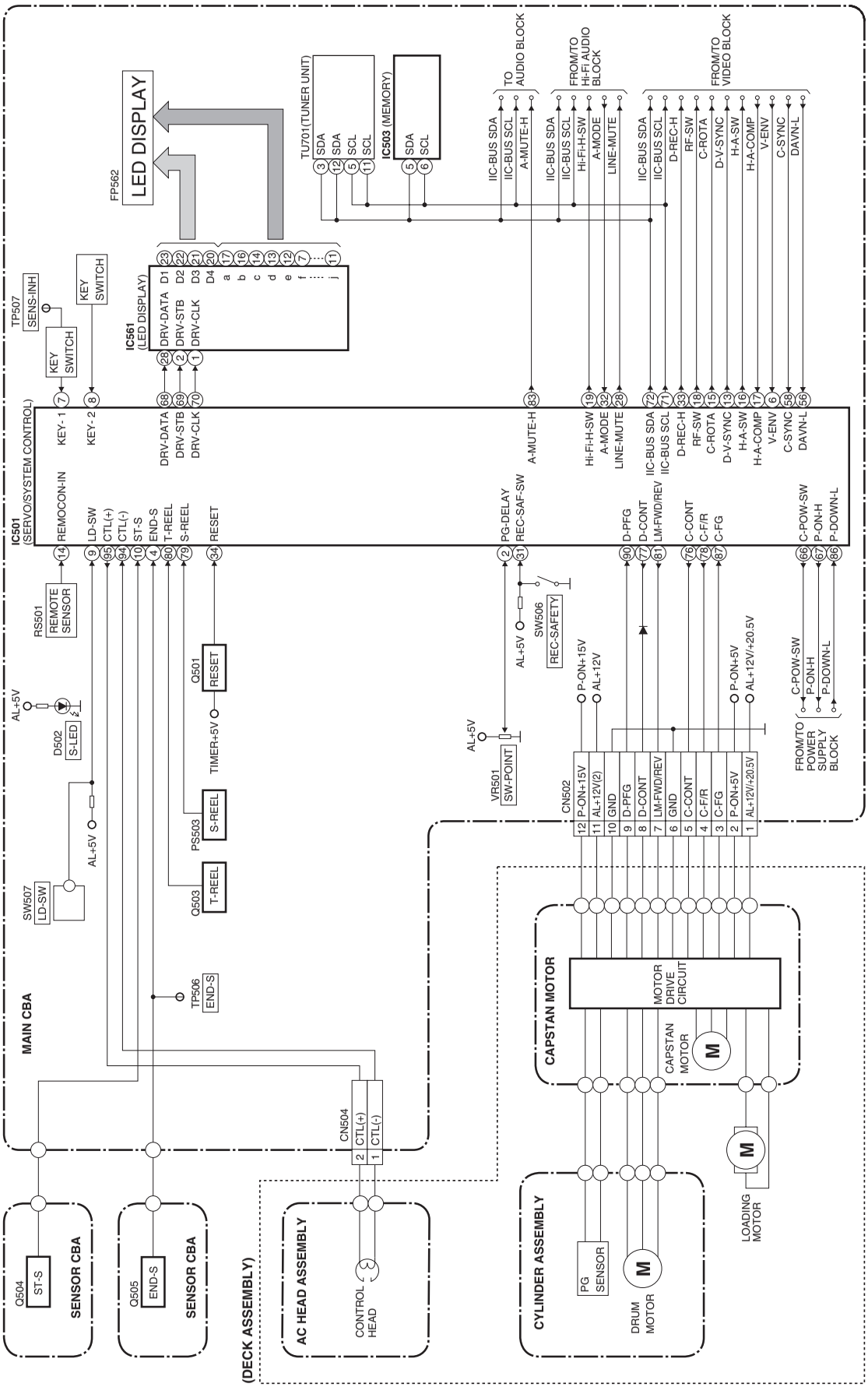


Sub Jack CBA Bottom View

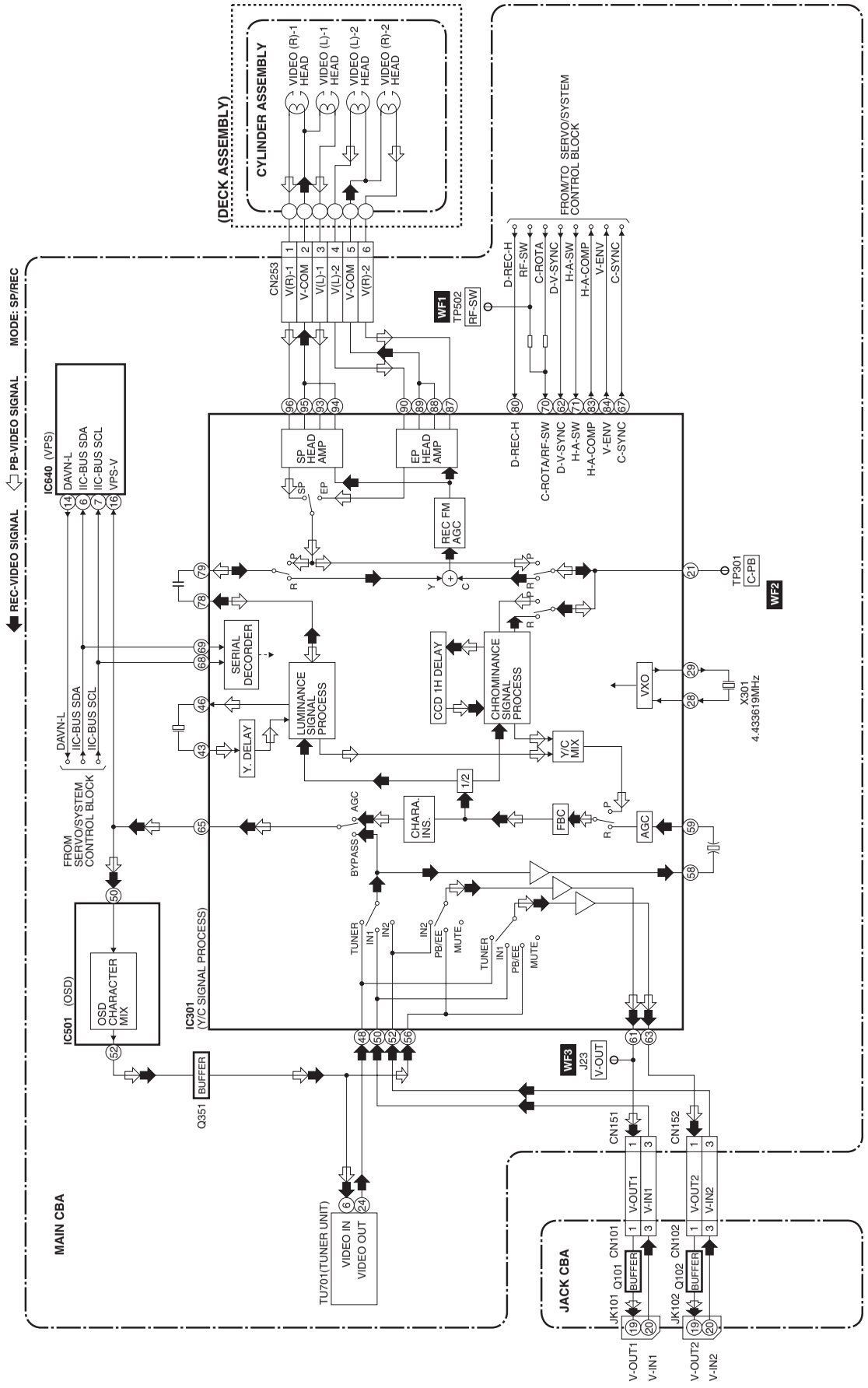


B BLOCK DIAGRAMS

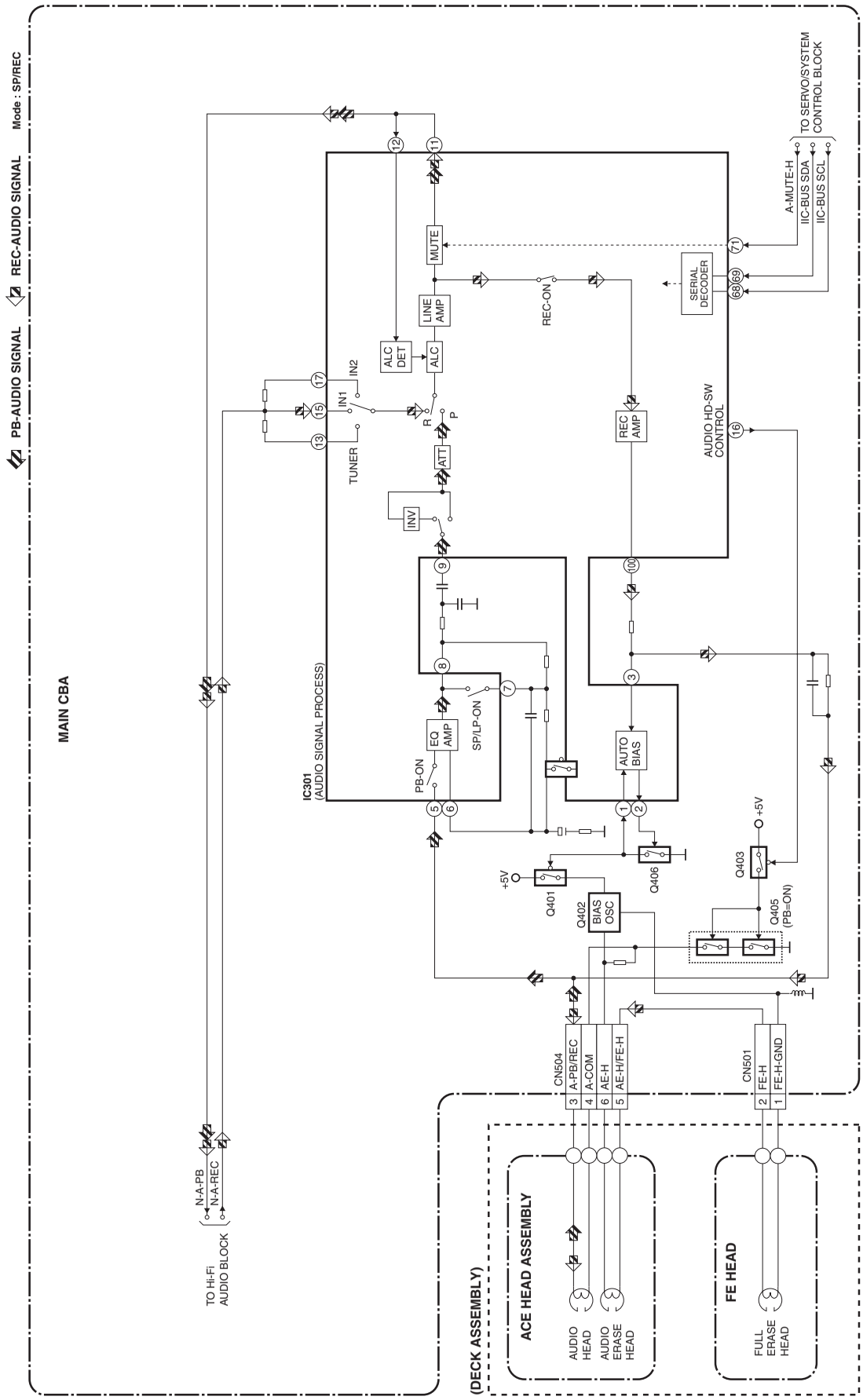
B-1 Servo / System Control Block Diagram - VT-FX540E(UK)



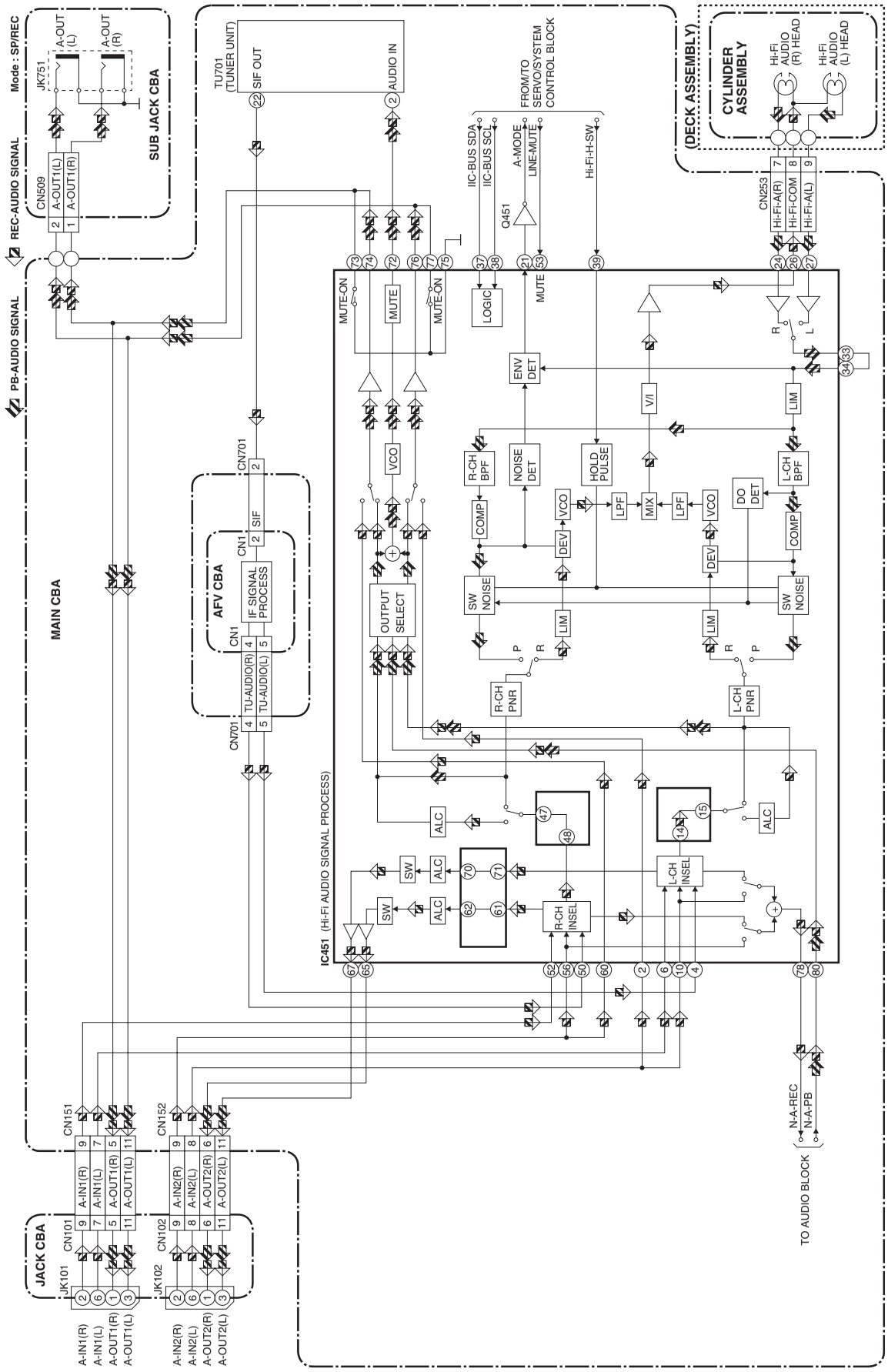
B-2 Video Block Diagram - VT-FX540E(UK)



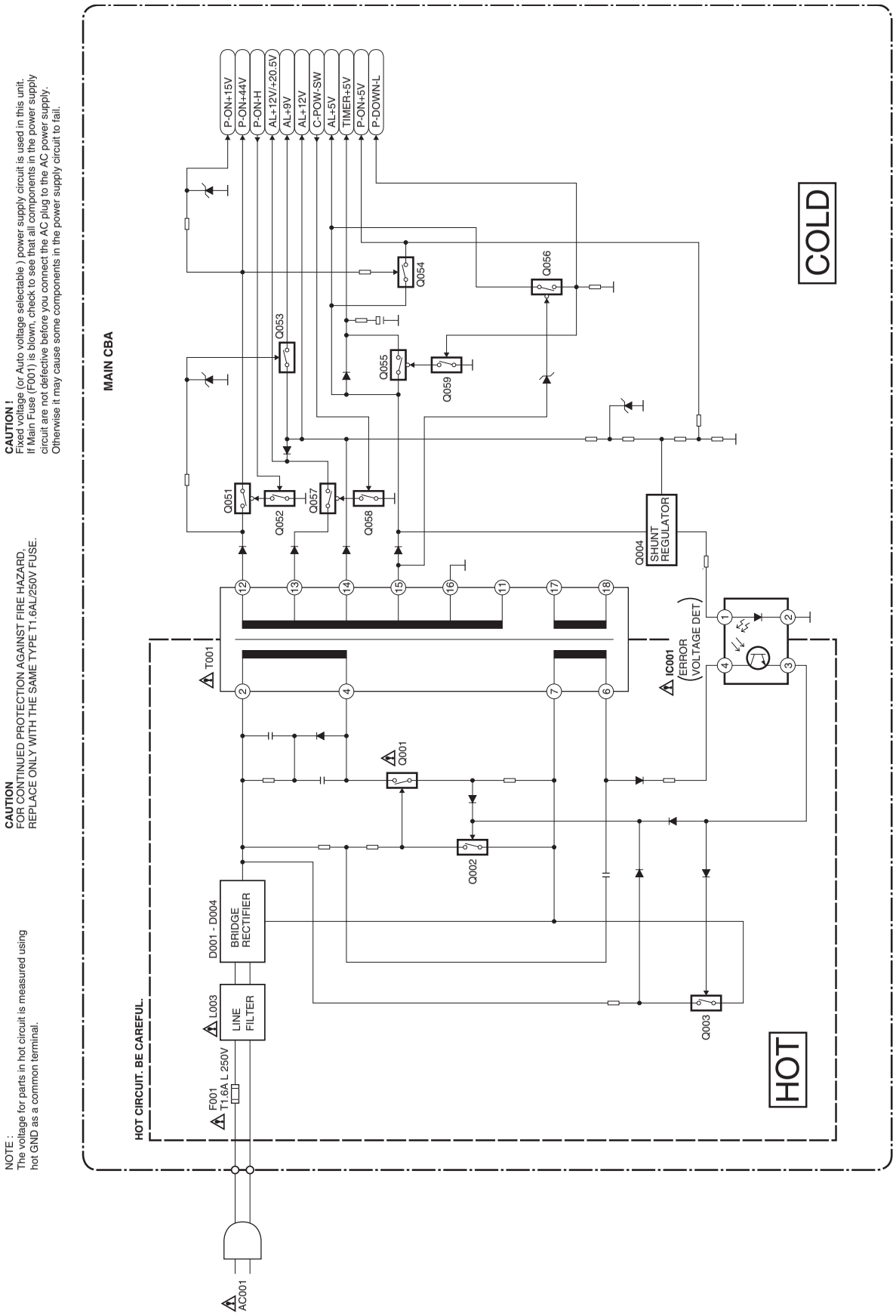
B-3 Audio Block Diagram - VT-FX540E(UK)



B-4 Hi-Fi Audio Block Diagram - VT-FX540E(UK)



B-5 Power Supply Block Diagram - VT-FX540E(UK)



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